The Reindeer's Successor

MOTOR AGE

Vol. XXX
No. 25

CHICAGO, DECEMBER 21, 1916

Ten cents a copy
Three dollars a year

Are You Content to Remain the Dealer of the Second Choice Car?

We don't reproduce here an advertisement to car buyers. For our talks to users and to dealers are much alike on Hudson Super-Six. Why men buy it is exactly why other men should sell it.

Last year thousands of buyers had to take second choice because there were not enough Super-Sixes to go around. Were you one of the dealers who took care of this overflow? Then, too, the average automobile dealer is *through* in August. His profits stop. His business is at a standstill for several months.

Did Your Income Stop?

Did your income stop last summer or did you, like Hudson dealers, make a profit in September, in October and in November?

Super-Six deliveries to users in October and November exceeded only two months' previous records in our history.

The demand for the Super-Six increased—it did not drop off as your business probably did, when the normal "slack" season for automobile selling arrived. Then Hudson dealers were having their three best money-making months.

Reasons for This Remarkable Showing

The Super-Six motor, an exclusive Hudson feature, has increased motor efficiency 80%. No other car can use it. It is patented.

The Hudson Super-Six has won all worthwhile records.

Across the continent from San Francisco to New York and back—6,972 miles in 10 days and 21 hours. All previous one way records were beaten—no other car ever attempted the round trip.

The fastest time up Pikes Peak against twenty competitors.

100 miles at the rate of 74.67 miles per hour.
1819 miles in 24 hours.
One mile at the rate of 102.53 miles per hour.

Now all this has made it EASY to sell the Hudson Super-Six.

If you must exert effort to sell every car you handle, your business can't be profitable. Prospects must come to you, otherwise your business is all hard work.

How to Become a Hudson Dealer

Not by merely answering this advertisement. No, we are not so free with the Hudson money-making franchise as that.

Now that our organization is so large, the unquestioned largest automobile distributing organization in the fine car field, we don't have so many opportunities. We are not satisfied just because a contract is made with someone to handle a certain territory.

It is more important that we know how that territory is to be handled and more than that what potential qualities the man has for expansion and growth.

For you know by Hudson history we have never slackened, never failed to show each year a marked development in our own growth. And today the dealers who are most valuable are the ones who have grown with us.

Our conception of this business is that the dealers and we are partners and we must all make profits.

If you don't know us and would like to tie your future to such a partnership, write us.

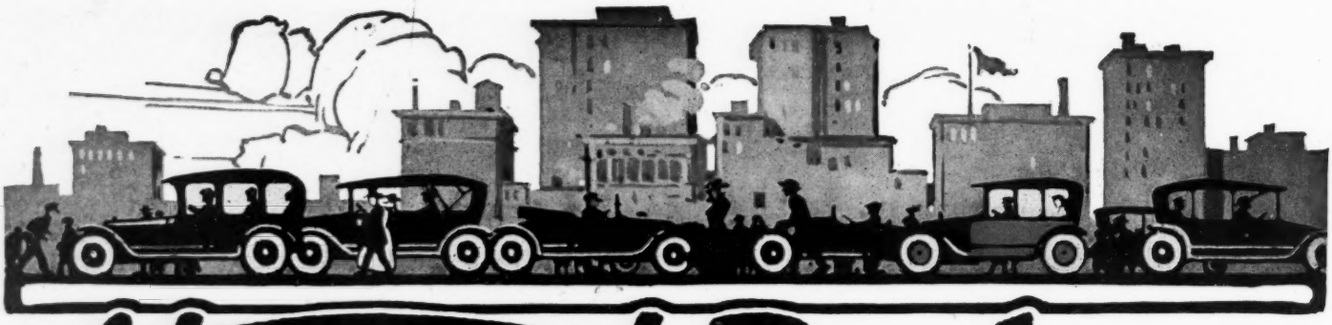
Who knows to what it may lead?

HUDSON MOTOR CAR COMPANY
DETROIT, MICHIGAN

HUDSON SUPER-SIX

Editorial Contents—Page 3

Advertisers' Index—Next to last page



Stewart Products

$50

Warner
Auto-Meter

$25

Stewart
Speedometer

Another Winter Business Leader

All Stewart Products are necessities for winter driving. That is why they are such big sellers every day—week in week out—in all seasons.

Of these, the Stewart Vacuum System is very important. In winter, a positive, unfailing gasoline feed is necessary to insure quick starting, and a smooth running of the motor.

The Stewart Vacuum System maintains a constant supply of gasoline above the carburetor. This insures a perfect gasoline feed; besides keeps the gasoline warm, which makes starting easy.

Most new cars are equipped with the Stewart Vacuum System. Thousands of old cars are not. The owners of these old cars would quickly install a Vacuum System if some enterprising dealer would point out its advantages, particularly for winter driving.

Here is a big opportunity for dealers to add to their winter business. Drive away the dull-winter-business-period by going after this business which is plainly in view.

There is also a big business awaiting dealers on the Stewart Speedometer, Warning Signal, Tire Pump, and V-Ray Spark Plug.

"It will pay you to see that every car is Stewart-equipped"

Stewart-Warner Speedometer Corp.
CHICAGO, U. S. A.

$6

Stewart
Motor Driven
Warning Signals

$3.50

Stewart
Hand Operated
Warning Signal

$10

Stewart Speedometer
for Fords

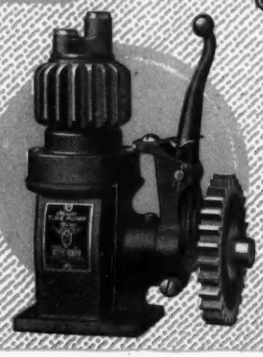
$1

Stewart V-Ray
Spark Plug

Stewart
PRODUCTS
PRESTIGE
QUALITY
SERVICE
SATISFACTION
MADE IN
USA

$10

Stewart
Vacuum System



$12

Stewart
Tire Pump

MOTOR AGE

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CHICAGO ILLINOIS

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Vol. XXX December 21, 1916 No. 25

Contents

THE REINDEER'S SUCCESSOR..... 5
St. Nicholas' twentieth century steed a motor truck
TIRE PRICES TO RISE..... 9
HOOSIER SWEEPSTAKES MAY GO TO CINCINNATI 10
EDITORIAL—MOTOR CARS AND THE CHRISTMAS SPIRIT 12
DENIES PLEA FOR SETTING ASIDE INJUNCTION 14
HOW LONG FOR WOMAN TO MAKE UP MIND.. 16
BRITISH SOUTH AFRICA NEEDS CARS..... 18
BOSTON HAS INDIVIDUAL TRAFFIC PROBLEM 22
CHRYSLER, THE MAN BACK OF BUICK PRODUCTION 24
ELECTRICAL EQUIPMENT OF THE MOTOR CAR 30
MOTOR CAR DEVELOPMENT..... 35
Harroun, American, Elgin, King and Johns-Manville speedometer illustrated and described

DEPARTMENTS

FROM THE WOMAN'S VIEWPOINT..... 26
MOTOR CAR REPAIR SHOP..... 44
READERS CLEARING HOUSE..... 46
ACCESSORY CORNER..... 50
FROM THE FOUR WINDS..... 52
AMONG THE MAKERS AND DEALERS..... 54

ANNOUNCEMENT

The annual review of the year will be featured in the issue of Motor Age for December 28. In this recapitulation will be given important events in the year's motoring, racing, production, development and special activities.

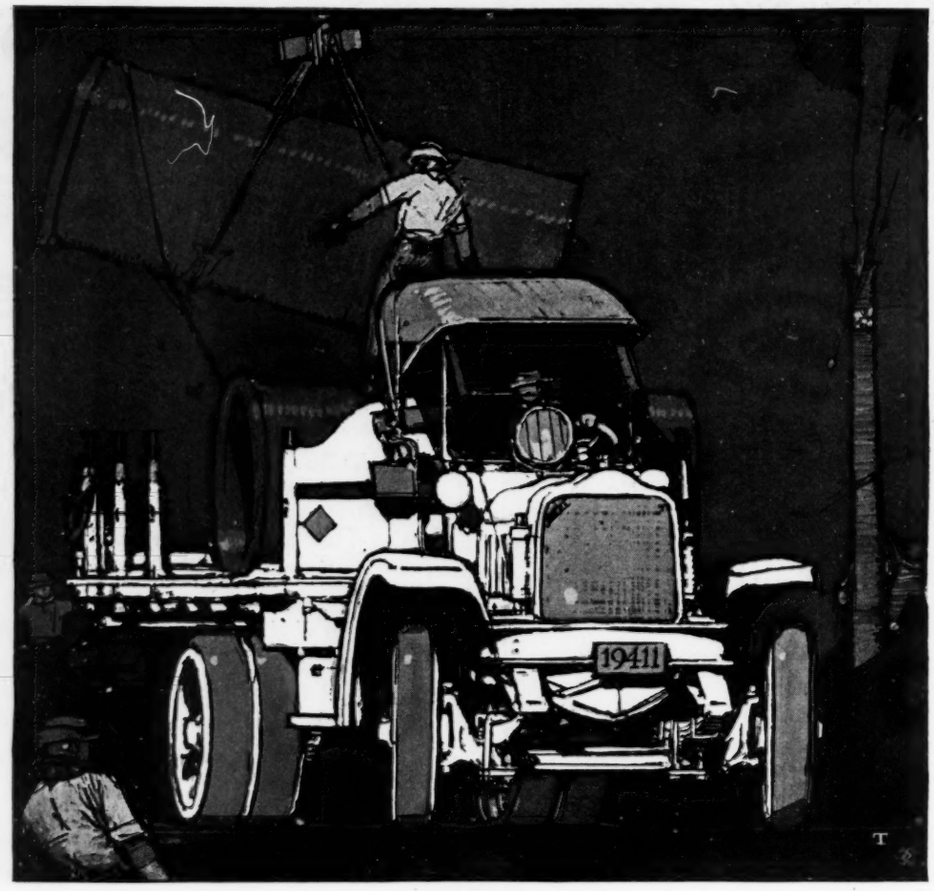
Big New York Show Issue of MOTOR AGE January 4th

Editorial Contents

This great motor journal of international reputation will present the greatest and most complete illustrated department of 1917 cars ever printed. Thirty-two complete pages will show cars of many models from 150 or more different makers—five-passenger touring cars, seven-passenger cars, coupes, sedans, convertibles, limousines, landaulets, broughams — all styles segregated and with name, model, price, passenger capacity and many other facts the owner wants to know. Added to this will be many pages of complete tables giving every mechanical detail of the cars. For the reader who wants to know what each maker has done during the year there will be a car-by-car story of the improvements made, new models brought out, new color schemes, etc. This car-by-car review will bring the reader right on to the doorstep of January 1 and will contrast past practice with present achievements.

Send Advertising Copy Early

Motor Age
Mallers Building,
Chicago



More White Trucks are put into service each year than trucks of any other make.

It is a significant fact that the majority of these trucks are purchased in fleets by large motor truck owners whose only criterion of value is performance in terms of eventual cost.

THE WHITE COMPANY
CLEVELAND

Vol. XXX, No. 25 Chicago, December 21, 1916 $3.00 Per Year

MOTOR AGE

The Reindeer's Successor

St. Nicholas' 20th Century Steed a Motor Truck

By W·K·Gibbs

WHAT has become of the S. P. U. G. sponsor? He, or possibly I should say she—if it was a woman I stand corrected—must suffer the pangs of the crowned heads of Europe who see their ranks mowed down by 42-centimeter guns, for it seems the aggregate membership of the Society for Prevention of Useless Giving is shrinking almost, if not quite, to the point of disappearance. It is just possible I may be wrong in assuming that the spugs have become almost a negative quantity perhaps everyone in general, and in Chicago in particular, are spugs, with the "u" standing for "useful" instead of "useless." This much I do know: Chicagoans and those who live in the next to the second largest city in the United States—the suburbs of Chicago—and come into the middle western metropolis to do their Christmas shopping are buying more this year than ever before. This brings me down to the subject of which I intend to give you a thought, that in your mad rush at the last moment to complete your list you may have forgotten, or possibly it never entered your mind.

Down through the Mecca of middle-western Christmas shopper—State street, Chicago—I struggled with the maelstrom of humanity to find how the jolly, bewhiskered old saint of our childhood days moved the gifts, through a corps of assistants from his storehouses—the department stores—to the "stockings all hung by the chimney with care." I use the term "down," in connection with delivery, advisedly, for everything one buys in State street department stores, be it so bulky that one cannot carry it, or so small it can be covered by the hand, if one has it delivered, about the first thing it does after being wrapped is to go down; down below a point where the general public is allowed the privilege of going. Department stores have basements, sub-basements and second sub-basements, and it is to one of these department store mines that all delivery packages go to be sorted and handled by hundreds of packers and shipping clerks—modern emissaries of Santa Claus, who are as keen to have the purchase arrive at the psychological moment as we once supposed Saint Nick and his eight fleet reindeer were to reach our individual chimneys on schedule.

There is a link between the proverbial mantle and the department store shipping room which is probably the most important of any in the Christmas chain and that is the motor truck, which has all the attributes of the once-famed Donner and Blitzen, Prancer and Vixen, plus. Admonition to shop early, like the poor, is always with us, and the ratio between those who heed it and those who do not is as the population of the hamlet is to that of the metropolis. Of course, there are those who shop early and send their gifts away several days in advance of December 25, but so many of them forget both the "don't

open 'till Christmas'' label and the curiosity of human nature, that some late shopping is necessary. The package arrives early and is opened. Perhaps the recipient did not expect it or if he did the present he planned to give in return is either too good or not good enough, so in these days when so many people live by comparison some late purchases are quite necessary. The majority of them are not, however.

That twentieth century link in the Christmas chain, which I mentioned before, has no relationship to the famous one that's missing, and consequently you fifty-ninth second shoppers get your late purchases on time, thanks to motor vehicles, plus the twin genii of modern times, electricity and gasoline. Perhaps you will say, ''I used to get my Christmas purchases delivered in the days when there were no motor trucks.'' I'll grant you that, but it must have been a doubly-Herculanean task then if the present work may be taken as a criterion. After threading the underground maze of Marshall Field & Co.; Stevens; Carson, Pirie, Scott; Rothschilds; Siegel-Cooper; Hillmans; the Boston Store and the Fair, and viewing the seemingly millions of packages destined to the homes of Chicagoans, I wonder what the present day department stores would do without motor vehicles for delivery.

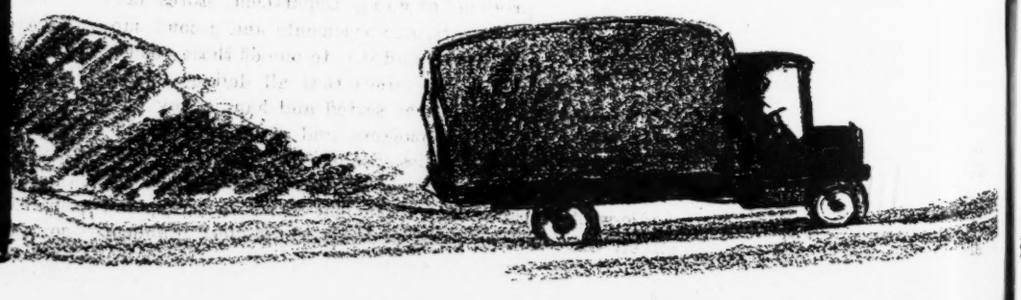
Chicago's First Delivery Truck

It is only within the last few years that Old Dobbin has been permitted to enjoy an equine Christmas eve. The first motor vehicle ever used for delivery purposes in Chicago did its pioneer duty less than a score of years ago. Charles A. Stevens & Bro. was the first Chicago store to put a motor vehicle on the street for delivery work, and compared with the present efficient vehicles, its worth was negligible, although it attracted the attention of merchants throughout the world. The mother of Chicago's merchant prince, the late Marshall Field, requested and was given a ride in one of these first two motor delivery vehicles operated by Stevens. She was an octogenarian then, and that was the day of the ''horseless carriage.'' Who of you that are reading this would crave a ride in a department store delivery truck today? Very few of you, I imagine. Why? Because motor delivery has become an institution and when things get common they lose interest for us. Nevertheless we cannot get along without our institutions, of which the motor truck surely is one.

What I am about to tell you now may seem incredulous, but the veracity of it can be verified. Motor trucks in delivering purchases made in Chicago department stores on the last shopping day before Christmas this year will travel between 6 o'clock and midnight, approximately the distance around the earth at the equator. I arrive at these figures by a process of average. On Christmas eve last year the total mileage the motor trucks in the Marshall Field fleet traveled between 6 o'clock and midnight was 10,589. This gave each vehicle an average of slightly over 30 miles. This year there are very close to 900 motor vehicles in use in the combined State street department store fleet, all of which will no doubt average 30 miles during next Saturday evening. Omnipresent Santa Claus, with his dashing double four-in-hand, could not have done better in his prime.

Some mathematical wizard has figured out that the total department store visitors daily during the week before Christmas is something near 3,500,000 or 4,000,000. Of course, this does not mean that there are that many individuals in the Chicago ''loop'' on those days, even though it would not be difficult to find persons who would take their oath they had been jostled by that many bargain hunters any day. Few people go to one store and confine their purchases to that establishment. They want to see what each store has to offer and consequently they do if they have strength and courage. Anyone who ever has attempted to find his way through a State street shopping crowd at holiday time will tell you that it requires first of all strength, then courage and many other elements of a physical and mental character. Commuters from Gary, South Chicago, Hinsdale, North Chicago, Evanston and other suburbs dash madly toward State street, work their way through the crowd and after having made a purchase consume much of their remaining energy impressing the clerk with the necessity for having the purchase reach their station in some such ridiculous time as 15 minutes hence that they may catch the 5:15. In most cases they are accommodated, which speaks for the efficiency of the modern delivery system, of which motor vehicles are such an important cog in the wheel.

Let us follow a purchase after you leave it in the store and see what is done with it before it finally reaches its destination. Elevators take it to the shipping room level, be it in the first, second or third basement. Here a force of sorters separate



it from packages from other departments and it begins a rather circuitous journey along conveyors that run in every direction. At intervals it will come to some junction point over which another force of sorters have charge, like the towerman who shunts trains across the junction of many railroad tracks. Packages are resorted here and placed on other conveyors and this is kept up until the particular purchase is brought to the section from which it goes to some outlying distributing station.

Each store has distributing stations in different parts of the city to which all packages for delivery in a particular section are sent, some stores using large trunks in which to put the packages that go to distributing points. At these distributing stations packages are again segregated for delivery into closely-defined districts and the smaller vehicles are loaded and sent out for the final step in the delivery system.

Assuming that 400 deliveries make the average load for final delivery, and assured by heads of delivery departments in the State street department stores that every vehicle they own or control will be used to capacity from the time the final curtain is drawn on this year's Christmas shopping until all deliveries are made, it seems probable that during this time over 400,000 packages, or deliveries, ranging in size from one that could be easily carried in the pocket to the heaviest and largest piece of furniture for the home, will be handled by the army of men in the delivery departments of these stores.

Approximately 4,000 men are employed in getting the deliveries from counter to home during the Christmas rush on State street. When it is considered that the two leaders in deliveries among the nine department stores on State street delivered from 80,000 to 100,000 packages daily during the 2 weeks preceding Christmas last year, some idea of the immensity of the work of handling Christmas deliveries will be gained. It means that employes of each store must ring 80,000 to 100,000 doorbells daily; that the same number of stops must be made by the driver of the vehicle. If you want to conjure a little you might try to imagine how many stair steps will be climbed by delivery men in leaving 400,000 deliveries at Chicagoan's doors between 6 o'clock and midnight next Saturday, and determining this, how far it would take one person if the stairs were continuous instead of broken into one, two or three flights to the building. Don't forget that they all come down again; that might make another interesting figure.

St. Nicholas with his two handy men, gasoline and electricity, is a combination that will be hard to beat in the night of December 23 this year. In place of his eight reindeer he will have 900 vehicles, each with the power of his double four-in-hand several times over. He may be charged with showing some partiality as between his two faithful assistants, for he will direct 531 electric vehicles and 329 gasoline on the rounds this year in Chicago and suburbs. The gasoline trucks do much of the heavy work between stores and distributing stations, of which the combined total of the nine big Chicago stores is fifty-three, while the electrically-driven steeds will work mostly from the distributing stations to the homes.

Goes to Extremes

It makes no difference if the customer lives among the elite of the North Shore, in the Ghetto, out "back o' the yards," in South Chicago, Hinsdale, West Chicago, Hammond or Gary, Ind., if he or she makes a purchase in State street department stores next Saturday, some one of these several hundred motor trucks that go to make up the Christmas fleet will stop at his or her door some time before midnight December 23. Every store manager informs the public that any purchase made on December 23 will be delivered before midnight and in making this promise he assumes a moral obligation that every attache of the store bends effort to fulfill.

This rather formidable array of trucks will start on the final lap of the delivery work at 6 o'clock next Saturday night and will cover every part of the city of Chicago, which embraces some 193 square miles—an expanse of territory about one-third the size of the state of Rhode Island—in addition to the suburbs, north, south and west, some of which are from 30 to 40 miles distant from the shopping district of Chicago, and all of this in 6 hours—hours in which every minute must be utilized in order to keep records clean and put the stamp of veracity on the advertisements that appear on the moring of the last shopping day to the effect that all purchases will be delivered by midnight.

Every available vehicle is put in service to clean up the last day's deliveries. If a driver is unfortunate enough to have his truck break down he might ask for another to replace it, but it would be physically impossible for some delivery managers to accommodate him because none are held in reserve for that purpose. Last year, I am told by delivery managers in two of the biggest State street stores, motor trucks went through the last of their Her-

This is the first motor delivery vehicle ever used in Chicago, possibly in the world. It was an electric made by the American Electric Vehicle Co. and created much comment that was worldwide. The mother of the late Marshall Field asked for and was given a ride in this vehicle, such was the interest in the then "horseless carriages." Getting enough power to run it was a problem. It frequently found itself too weak to get home and S. O. S. calls were sent out for assistance. Maintaining the two vehicles used is said to have put the company who sponsored it in financial difficulties, it having agreed to mointenance when Stevens bought them in September, 1897

culean struggle 100 per cent efficient. It may be contrary to Fate to tempt it to the extent of not holding reserve vehicles to fill gaps brought about by the skidding of a truck, collision with other vehicles, etc., which put it out of the running. Perhaps some of the stores will keep a limited number of trucks in readiness to respond to the S. O. S. of a driver whose steed has found the gruelling grind of Christmas too great. Delivery managers will not breathe easy until the last truck shall have reported to its garage and with its record clean.

The last mad rush is a battle between human and mechanical energy and the big and little glooms that are seeking a place in the hearts of every last-minute customer who is listening expectantly for the doorbell to ring before Christmas eve—the delivery Christmas eve comes a day early this year—shall have dropped off to sleep in the arms of Christmas. To be disappointed at Christmas is contrary to the spirit of the yuletide. To be responsible for disappointment over the delayed delivery of a Christmas gift purchased in a State street department store is akin to crime and every employe will make it his business to see that the burden does not fall on his shoulders.

It would require at least 2,000 horse-drawn vehicles to do the work which motor trucks will do for the department stores next Saturday evening, and it would take them 18 hours instead of 6, according to estimates of various delivery managers. The long hauls would be practically impossible with horse-drawn equipment, for it is doubtful if equine muscles could withstand the terrific strain under which motor vehicles labor during the first 3 weeks of December.

Deliverymen, like lovers, are glad when Luna beams forth on Christmas eve,—their Christmas eve is not spent like yours, for while you are trimming the tree, visiting loved onse or doing the thousand and one other things that individuals do on the eve of Yuletide, they are working. Out in the streets of the great city go an army of workers, and a dark night holds no charm for them. Many a man has had the glint of corner light flash in his face from reflection on the blue steel of a sixshooter and relieved of his employer's money obtained on C. O. D. packages. That's why deliverymen like to see the moon on Christmas eve, for footpads are frequenters of the dark and prowl when its coldest.

Every official of the many big stores will be doing his share to make the final delivery run as smoothly as possible. Some may even take deliveries on their way home, as such has been done in previous years.

Special Vehicles Used

Vehicles that had no part in the delivery department of department stores prior to the Christmas rush will be pressed into service Saturday night. Cars used by employees of the stores in their daily work will become delivery vehicles for this occasion.

One store has chartered seventy-two outside trucks for Christmas delivery and all have from a half dozen up.

When you wake up Christmas morning and look over the family tree, festooned wiht glittering ornaments and bending under its load of gifts, if there is one upon it that came late Saturday night, but still in time to gladden the heart of the one whose name is then upon it, try to imagine what disappointment would have been yours and theirs if it had not arrived on time. Then give thanks to the twentieth century creation that makes possible the handling of thousands of late purchases for Christmas and getting them to you on time.

Santa Claus, a romantic and fanciful figure, has been with us throughout the Christian era, but evolution has got the old boy just as surely as it gets all of us. If he came down to the twentieth century with any idea that he could stem the tide

Greetings from Your Humble Servant

By William K. Gibbs

I'm not a thing of beauty,
But still I'm very proud.
The Christmas spirit's in my heart,
I sing in voice that's loud.

I've superseded other steeds—
With me they have no show.
My strength is great, also my speeds,
Fatigue I never know.

I hit the trail on Christmas eve,
St. Nick is at the wheel.
I conquer miles, I carry loads
No reindeer could, I feel.

Reindeer of the frozen North
No longer stamp upon the snow,
For Santa Claus has chosen me
To take him where he wants to go.

To me the great adventure comes,
I'm looked upon to bridge the gap
Between the storehouse and the home—
Reindeer may sleep; I never nap.

Stockings filled on Christmas morn,
A toast to you, "Here's How! Good Luck!"
I brought you gifts, now please accept
My compliments.—A. Motor Truck.

of evolution he must have suffered some chagrin. No matter how dear his Donner and Blitzen, Prancer and Vixen may have become to him, he has found it necessary to turn them out to browse off the limbs of the North Pole and in their stead make use of their worthy successors, motor trucks, gasoline and electricity.

WHEN IS A BUS?

Los Angeles, Dec. 15—"When does a rent car or taxicab become a motor bus?" The utilities board has been asked to decide this question, which has been raised by the difference in license fees required by the city from operators of passenger-carrying rent vehicles. Cars that operate between the city and suburbs without making stops along the route are now classed as motor buses. But when the same car stops at every corner for passengers or is available for use any place, it is said to be another thing.

Certain vehicles operate during the day as jitneys, but at night become rent cars, or taxicabs. The utilities board asked for time in which to arrive at a decision, but ruled that jitneys, buses, rent cars or anything else of a similar nature are prohibited from the use of trailers for transporting additional passengers.

TRAFFIC MEN MEET

Detroit, Dec. 14—More than twenty representatives of the largest motor car makers met here yesterday nad indorsed the work of the traffic department of the N. A. C. C. and the committee of traffic managers who have endeavored to force the railroads to give proper protection to the motor vehicle freight cars that are now scattered over the country and are doing all sorts of service except that for which they are intended.

Tire Prices to Rise

Threatened Increase of 20 Per Cent May Come in the Very Near Future

Crude Rubber Now 80 Cents a Lb. —Fabric High Also

NEW YORK, Dec. 18—The rise in the prices of tires, threatened for the last few weeks, is not far off, according to the rubber trade in general. Prices are expected to go up at least 20 per cent. The material scarcity and their unprecendented prices have been the main reasons for the rise. Though rubber has not risen exorbitantly, averaging 80 cents a lb., the other materials which go into the makeup of tires, have risen on an average about 20 per cent. For instance, tire fabric, one of the important parts of the tire, has risen in price about 100 per cent. Chemicals, cotton, labor, rent, shipping conditions, all have had their potent effect on prices.

A few of the tire companies are looking to the future by advising their dealers to get in their tires immediately. One prominent concern is taking no large orders but advises its dealers to buy at present prices.

One of the largest companies is guaranteeing its prices for 3 months. Other concerns state that there is no logical reason why prices should not go up at the present time, that they are waiting for some company to take the initiative in the matter, and for that reason some of them are not accepting orders for future delivery at guaranteed prices.

The high cost of fabric has been largely responsible for the threatened rise. Tire fabric has gone up from 50 to 96 cents a lb. on account of the big scarcity of Egyptian and Sea Island cotton, two of the most popular grades used. Submarine warfare, weather conditions, and manipulation on the Alexandrian Exchange were responsible for a big rise in Egyptian cotton. Great Britain is largely in control of the Sea Island cotton, which is mainly contracted for before the American tire makers or duck makers have a chance to buy.

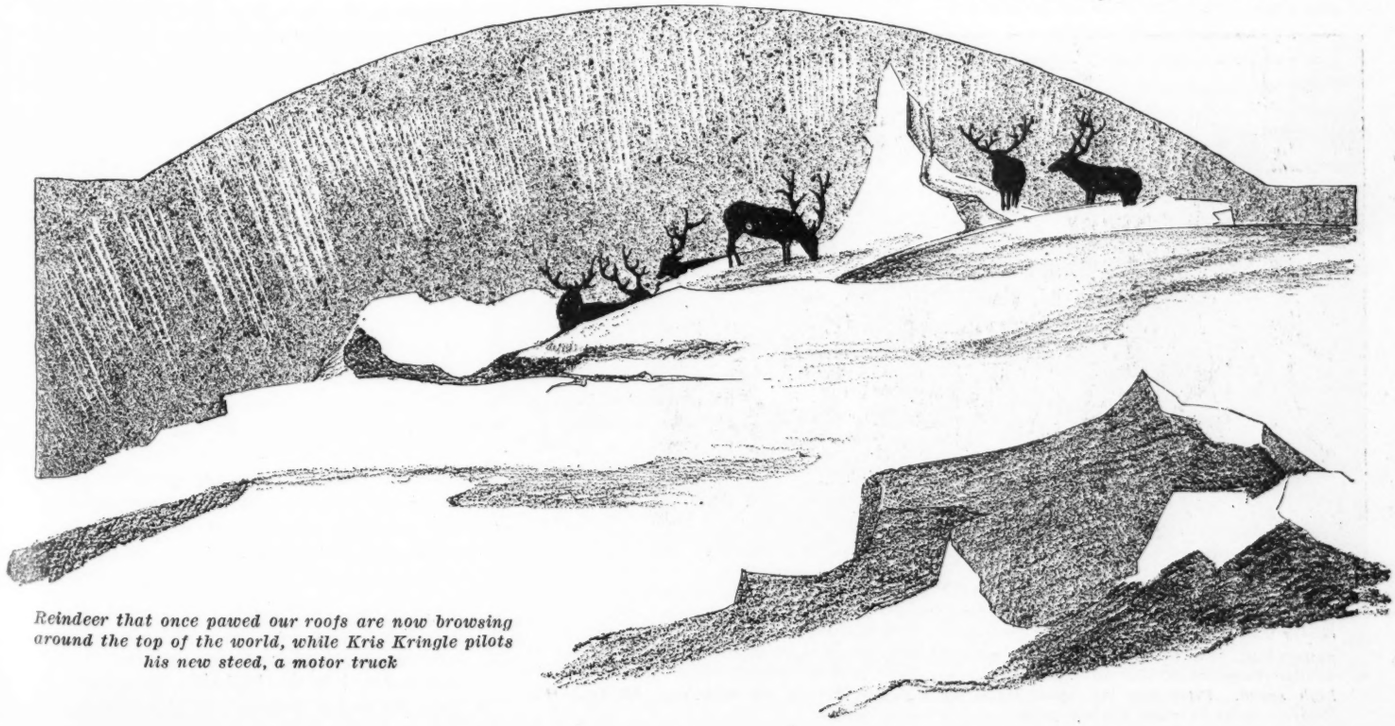
RESIGNS AS PACKARD CHAIRMAN

Detroit, Dec. 14—H. B. Joy has resigned as chairman of the board of directors of the Packard Motor Car Co., stating that too many other interests require a great part of his time. The directors also voted, at the meeting which was held yesterday, to increase the annual divided from 7 to 8 per cent.

GETS PERPETUAL INJUNCTION

New York, Dec. 16—A decree of perpetual injunction carrying costs and reference to a master of accounting for assessment of damages has been signed in favor of D. Mc Livingston and his licensee, the Ospeco Mfg. Co., against the Lowe Motor Supplies Co.

As reported in Motor Age the suit alleged that the Lawco radiator shell and hood made by the F. H. Lawson Co., Cincinnati, Ohio, and sold by the Lowe concern infringed the Livingston patent No. 1,156,017 covering a mask for concealing the engine and radiator casing of a car. Judge Sheppard held the patent valid and infringed although commenting that no willful infringement was evident. The case was in the United States district court for the southern district of New York.



Reindeer that once pawed our roofs are now browsing around the top of the world, while Kris Kringle pilots his new steed, a motor truck

Hoosier Classic to Move

Excessive Rates Charged by Hotel Keepers Lead Officials to Contemplate Change

Cincinnati May Be Scene of Memorial Day Motor Race

INDIANAPOLIS, Ind., Dec. 19—Carl G. Fisher, president of the Indianapolis Motor Speedway, announces he is considering plans for staging the annual 500-mile international sweepstakes race at the Cincinnati Motor Speedway on Memorial Day because of the treatment accorded motorists in Indianapolis by hotelkeepers. Fisher is incensed because hotel owners have insisted on charging motorists who come here to attend the races as high as $25 a day for rooms for which the charge normally is from $2 to $4. He declared the speedway management can make as much if not more money by staging the race in Cincinnati. Fisher declared the attitude of Indianapolis hotelkeepers has given the city a black eye with motorists throughout the entire country. After the last race run here motorists who had been charged excessive rates for hotel rooms drove out of the city with signs on the rear of cars, reading: "To hell with Indianapolis."

RESTA OUT OF ASCOT

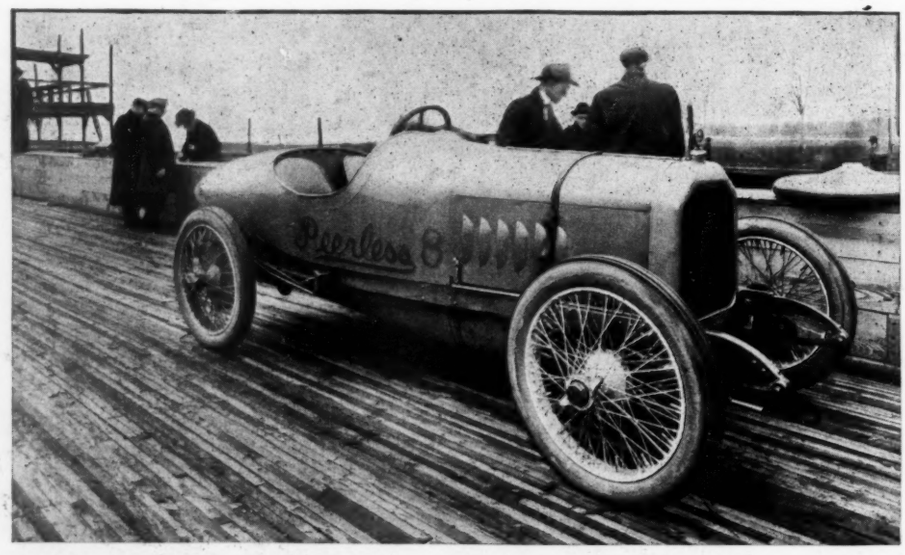
Los Angeles, Cal., Dec. 15—Dario Resta is satisfied with his 1916 racing season and for that reason has refused to accept the challenge to a match race of 50 mi. against Earl Cooper and Eddie Pullen, as the principal event on the Ascot speedway card for Christmas Day. Wilbur D'Alene, who finished sixth in the drivers' championship contest for the year, has taken his place. Cooper will drive a Stutz, Pullen, the Mercer that caught fire in the Grand Prize race; and D'Alene, either his own Duesenberg or Barley Oldfield's newest car with a special motor. The other races will be a 10-mi. event for Ford cars, limited to twelve in number, and an Australian pursuit race between four cars entered by motion picture studios.

CHALMERS MEN ON SPECIAL

Detroit, Dec. 15—A special train will carry what promises to be the largest single delegation at the national show at Chicago, when it leaves Oklahoma City next month with the Chalmers dealers, distributors and sub-dealers from the entire southwest. The excursion is under the auspices of several Oklahoma newspapers. A stop will be made for a day in St. Louis.

ANOTHER GASOLINE SUBSTITUTE

Chicago, Dec. 18 — Report comes from Australia and New Zealand that a process has been found by which about 7 gal. of motor fuel can be extracted from the peat in which the kauri gum is found. The peat yields from 20 to 30 gal. a ton, and 25 per cent of this can be used for fuel, while the rest brings good return as material for making varnishes. Kauri gum is the sap, or pitch, of prehistoric pines. Pure kauri gum, which comes from the swamps of New Zealand, is too valuable to be refined for fuel, but the peat in which it is found will yield an inferior grade of the gum and an oil that is supposed to be a partial decomposition of the gum.



The Peerless-built eight-cylinder motor that enabled Fetterman to maintain a winning average speed of 80 miles an hour in the dealers' event at the Uniontown, Pa., meet recently was entered as a special in compliance with the A. A. A. code. The changes in the powerplant, however, were in details and consisted chiefly of a different carbureter setting, raised compression and an increased oil supply to provide against the grind of continued high speed. Fifty-four mi. were made by the Peerless in 40 min. and 18 sec. The Peerless went through without stop

Military Mutilates Roads

Texas Highways Suffer from Effects of Heavy Hauling of Artillery and Supplies

Citizens Will Petition Congress for Repair Work Appropriation

SAN ANTONIO, Tex., Dec. 16—Heavy damage has been done to the macadamized roads in the vicinity of San Antonio, El Paso and other border towns by the military traffic that has been carried on over them during the last several months. In some instances the roads have been worn out by the constant movement of motor trucks, artillery and wagons belonging to the army. It is claimed that the Post highway, between San Antonio and New Braunfels, is in a state of dilapidation, due to the use which has been made of it by military contingents on practice marches. The roads around El Paso are said to be in even worse condition than those in the vicinity of San Antonio.

The question of the United States government being required to repair the damage which the army traffic has done to the roads recently arose both here and at El Paso. It is stated that a promise on the part of the military authorities was obtained to repair the roads around El Paso at the government's expense, due to the fact that they were in actual military use. The situation as regards the roads leading out of San Antonio is different, however, from that which exists at El Paso. When the matter was brought to the attention of General Frederick Funston, commander of the southern department, with headquarters at Fort Sam Houston, he said that he only had authority to repair roads which are used for military operations, and that the roads in this section were only occasionally used for that purpose. He suggested that the matter could be best handled by congress and that an effort be made to obtain a lump appropriation from that body to be used in making the necessary repairs of the damaged highways.

MANY MEASURES FOR ROAD BODY

Dallas, Tex., Dec. 16—Eleven distinct measures providing for a state highway commission are being prepared by different organizations of Texas to be introduced at the coming session of the legislature convening in January. A bill which is being indorsed by many good roads experts and motor clubs is that prepared by the highway department of the Agricultural & Mechanical College, with G. K. Goghlan drafting the measure. A bulletin on the formation of a state highway department will be issued by the college shortly, with the main points of the bill covered in the bulletin. In a talk before the Dallas Automobile Club this week,

Mr. Goghlan outlined the essential features of the measure.

The state highway commission as provided in the bill would be composed of five members, three to be appointed by the governor, one to be a member of the faculty of college and the other of the faculty of the University of Texas. All members would serve without pay.

The financing of the commission may be done in two days. One method would be by direct appropriation. The other, and the one favored by Mr. Goghlan is by a tax on motor vehicles. The bill provides for a flat tax of $3 per vehicle, but Mr. Goghlan has decided that a tax of $1.50 would be ample. He favors a flat tax instead of a horsepower tax, as the wear is not according to horsepower, he declares. A better method, in the opinion of Mr. Goghlan, would be to base the tax on the load per wheel or per inch of tire.

Companies Raise Prices

DETROIT, Dec. 18—The Standard Steel Car Co. has raised the price of all models $100, to take effect January 1.

FRANKLIN PRICE INCREASED $100

Syracuse, N. Y., Dec. 18—The Franklin Automobile Co. will increase the price on all models $100 on March 1, 1917.

MAXWELL PRICES UP

Detroit, Dec. 19—Special telegram—Increases in the price of the Maxwell touring six of $135 and in the price of the Maxwell roadster six of $120 have been announced to take effect January 1.

BUICK TO INCREASE PRICES

Detroit, Dec. 14—The Buick Motor Co. will increase the prices for all models to take effect January 15. The increase will make the new selling prices as follows: D-4-34, $660 D-4-35, $675; D-6-44, $1,040; D-16-45, $1,070; D-6-46, $1,440; D-6-47, $1,835.

PAIGE AND KING INCREASE

Detroit, Dec. 19—Special telegram—Last minute advices from Detroit makers are those of increases in prices for King and Paige models. The King Motor Co. announces its second increase. The seven-passenger and four-passenger touring cars and three-passenger roadster are now $1,585; the seven-passenger sedan is raised to $2,150. These represent changes from the tprices of $1,950 and $1,400 set Nov. 6, at which time notice of a probable future raise was given.

The Paige-Detroit Motor Car Co. announces new prices as follows: Stratford model 51, seven-passenger touring car, $1,495; Brooklands model 51, convertible roadster, $1,695; Linwood model 39, five-passenger touring car, $1,175; Dartmore model 39, roadster, $1,175. All closed cars remain the same.

Coast Gasoline Scarce

Fuel Will Cost Consumers 30 Cents a Gallon in Next Few Weeks

Supply Decreasing While Demand Goes Up—Famine in 6 Months

LOS ANGELES, Cal., Dec. 15—Gasoline will cost consumers 30 cents a gal. within a few weeks if the foreign demand continues to increase, according to Los Angeles oil company representatives. They say the supply is decreasing and if the demand does not fall off there will not be enough gasoline produced on the Pacific coast to fill orders in this section of the country by the middle of 1917.

These statements were made at a hearing held by the mayor and supply committee of the city council. The mayor desires to raise the standard of gasoline for city use above the 70 per cent now called for by the specifications. Some of the oil men have said that unless there is a change in conditions they will not bother about bidding for the city contract.

The public welfare committee is considering specifications to provide for the sale of high-grade motor and other distillates.

CHICAGO GAS UP 1 CENT

Chicago, Dec. 18—Gasoline took another rise upward here today when an increase of 1 cent a gallon went into effect for tank sales, making the price 17½ cents a gallon. Milwaukee prices also have been raised 1 cent. The higher cost of crude oil is given as the reason for the increases. Today crude oil had its second raise within the month of 10 cents a barrel.

MAXWELL OLD-CAR SERVICE

The large service division formerly maintained by the Maxwell company at Newcastle, Ind., in which all the old Maxwell-Briscoe cars, as well as all of the other cars built by the United States Motors Co., was taken over in October by the Standard Motor Parts Co., Newcastle, Ind. The stock taken over inventoried at over $3,000,000—not $3,000, as given in an earlier issue—and the purchase price was over one-quarter of a million. This service station is reported to be the largest in the United States, and it is stated that more service orders are filled from this point and a larger stock carried than from any other one point in the country.

HUPP CAR NEARS JACKSON

Jackson, Miss., Dec. 16—The Hupp capital-to-capital car left Little Rock, Ark., yesterday and is now en route to Jackson, Miss., after having covered all of the states west of the Mississippi and those north of the Ohio river.

HUGHES USED ANSWER PLUGS

In the various tables published giving the equipment of cars in the Pike's Peak hillclimb, Hughie Hughes' Duesenberg, was shown to have used other than Answer plugs, which according to the statement by Hughes was the type of plugs with which his car was equipped.

HUDSONS GABRIEL EQUIPPED

The Hudson cars entered in the Pike's Peak hillclimb last August were equipped with Gabriel shock absorbers instead of Hartford as was shown by some of the tables giving equipment of the participating cars.

ALLEN TO DROP $795 CAR

Fostoria, Ohio, Dec. 18—After January 10, 1917, the Allen Motor Co. will discontinue the manufacture of its $795 touring car and roadster and will confine the 1917 production to more expensive cars, one of them being the $850 Classic.

The Allen company is now producing bodies for its own models through its own body plant and contemplates the manufacture of bodies for its open models in the near future. A raise of $100, effective January 1, on closed models was announced 2 weeks ago.

The capital-to-capital Hupmobile doing the rough rider act through Texas. Washout near Sierra Blanca, Tex.

Motors and the Christmas Spirit

CHRISTMAS, more than any other season of the year, serves to emphasize the breadth of the field of usefulness of the motor car. At the same time is serves just as forcefully to emphasize the broadened opportunity of the motorist to assist in carrying to cheerless homes some of that spirit of good-fellowship that the day commemorates. Christmas is the season when our sympathies go out to others, forgetful of ourselves, and the motor car has become one of the foremost mediums by which our sympathies may be transmitted from a mere kindly impulse to a concrete good.

CHRISTMAS day and Christmas eve will see thousands of motors on our streets and highways, all bent on missions of cheer and good will, their ministrations giving a new urge of life to the ill and aged and a new joy to the young. The motor car has brought the people more closely together; it has extended the boundaries of the city into the country; it has brought the boulevard into touch with the tenement and has brightened it with the rays of a wider civilization and a broader humanitarianism.

THE principles of peace and good will, which came to this earth with the new star that piloted the three Wise Men nearly 2,000 years ago, have remained, though the rays of that star often throughout the centuries have been obscured by the clouds of war. For more than 2 years the smoke of a world war has dimmed the luster of its rays, and the principles it typifies have been submerged in a flood of blood and hate and flame that has rolled over three continents. No one knows when this carnage may cease, though many hope very soon.

THIS is the other side of the picture—the reverse, if you will—and in this upheaval of hate and blood the motor car has been a foremost factor. It has proved as formidable an ally of Mars as it has proved successful in the pursuits of peace. Those monstrous traveling forts, charging through entanglements of barbed wire, crossing trenches, bridging shell-pits, belching death and destruction from powerful guns, are as typical of this new age of motors as are the brilliantly lighted limousines, carrying their messages of good will on this side of the water.

THE part which motors play in everyday life is brought more forcibly home to us as we see the big-hearted motorist doing for others what they cannot do for themselves. Would he be so likely to get out in the slums and help the poor as quickly if it were not for his motor car? Could he minister unto so many if it were not for the speed of the motor car? It is doubtful. The motor car is a fixture and as much a part of our Christmas holidays as it is of our other workaday lives. As a purveyor of good cheer no one doubts its standing and as to its utility nothing need be said.

IN its more prosaic work, the motor performs a special service at this season. What the motor truck is doing toward making the Yuletide a happy one by distributing the toys and the good things of the season's festivities from the vast sorehouses of the city merchants to city and country buyers is told on other pages. The work of the motor truck at this time is one which helps in the dissemination of Christmas cheer. It bridges the gap between stores and the proverbial mantle.

The Christmas Car

By Ruth Sanders

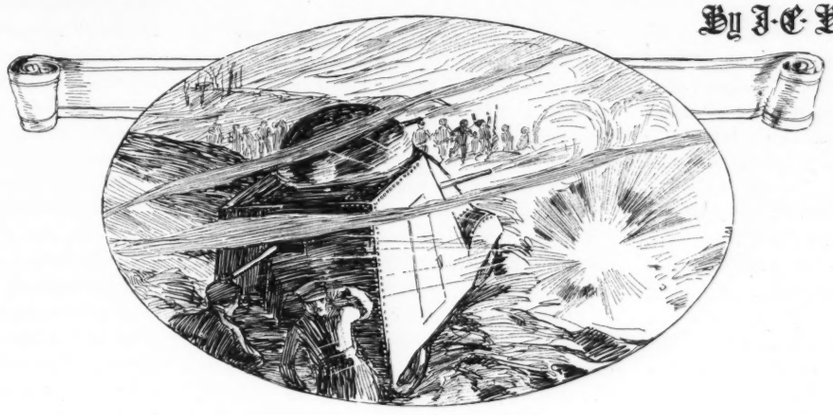
The time of gifts is come once more,
And by the room's dim light,
Against the frosted window pane
Wee faces are in sight;
The throbbing car stops near at hand—
St. Nick the note has filed
That motor cars can help him much
To find the poor man's child.

Since then the Star of Bethlehem
Has ne'er been seen, they say;
But all men's children still await
Each coming Christmas Day,
And there are motor cars that help
If days are cold or mild
To follow after Wise Men's lead
And find the poor man's child.

To reach the Star of Bethlehem
Three Eastern Kings, they say,
Across the trackless desert went
On that first Christmas Day;
A jeweled star served as a guide
In sky serene and mild
And angels sang of gifts they brought
To give the poor man's Child.

Judas Reincarnate, the Armored Car

By J-E Burton



Last night, my friend, I had a Christmas dream—
A vision first most gruesome, then most strange,
For fighting Europe came within my range
And in my sleep, I heard the shrapnel scream.
I saw the world at war and Peace cast out,
I saw men fall by thousands under fire
Of armored cars that put the brave to rout
And ploughed Cain's field, too strong to ever tire.

Hate was the song their roaring motors sung,
Their exhausts echoed hate at ev'ry bark.
Chaos joined Horror in a bloody lark
As Titan guns their awful challenge flung.
Slaughter in wholesale lots, that was their boast;
Their trail was red where once the field was green.
The war god raised his glass and drank a toast,
A toast in blood in praise of gasoline.

As petals of a rose drop from the stem
When blown, so in this charge men fell to die;
And brighter than the rockets in the sky
There gleamed a light, the star of Bethlehem.
Then came a Man who silenced Babal's cries,
Who stopped the ghastly carnival of Death;
I saw eternal sorrow in his eyes—
It was the Carpenter of Nazareth.

He spoke—the roar of armored cars was stilled:
"I come here not in anger or to blame."
Some motors coughed as if choked with their shame,
And Love warmed hearts that once by Hate were chilled.
The hordes of Mars ignored their lustful lord,
No longer were his sharp commands obeyed,
Spiked were his guns, surrendered was his sword—
"Judas now lives in steel, I've been betrayed."

"Inspired by God, man built the motor car
To carry joy, not sorrow, to the home,
A vehicle of peace in which to roam
And find the wonders known to lands afar.
Perhaps His aim you have not understood,
To conquer Time and Distance was His plan,
To bring about a closer Brotherhood,
But not for such foul use as killing man."

"To add to life and each man's happiness
This thing of steel divinely was designed,
But here at Armageddon now I find
You use it to destroy and breed distress.
In war, the gift of God you desecrate,
Each imprint of the wheel's a murder clue;
I kneel and pray—His mercy is most great—
Forgive them, for they know not what they do."

I heard no more and suddenly awoke,
The vision quickly vanished from my sight;
But in my dream, the ground was red with blood—
I looked outside, the Christmas snows were white.

Deny Petition to Annul Injunction

Ford vs. Dodge Case Still Gives Evidence of Life—Smelter May Not Materialize

DETROIT, Dec. 18—Henry Ford was defeated at another point in the Dodge Bros. suit when three circuit judges today denied his petition to annul the temporary injunction which restrains the Ford Motor Co. from carrying out its proposed program of development work.

The temporary injunction, which prevents Henry Ford and the Ford Motor Co. from erecting a $12,000,000 blast furnace plant, was granted December 9 in behalf of John F. and Horace E. Dodge, with an extension of 60 days, at the end of which time the court recommended the hearing of the suit on its merits. The Dodge brothers are seeking a permanent injunction to compel Ford to use the profits of the Ford Motor Co. for dividends instead of for expansion of business.

Ford's attorneys immediately took steps to have the injunction vacated. They argued that contracts for the construction of the large smelting plant near Detroit already had been let and that the Ford Motor Co. would lost a large amout of money unless the work could be resumed at once.

The offer of Ford to give bond to reimburse Dodge brothers for any loss they, as stockholders, might sustain if Ford is restrained permanently from caryring out his smelter project was not approved. The court also denied a motion by Ford's attorneys to have the Dodge brothers furnish bond of $3,000,000 to insure the Ford Motor Co. against loss as a result of the present injunction proceedings.

MAY MAKE LOW TAXIS HIGHER

Chicago, Dec. 19—A probable consequence of the recently approved drastic ordinances to clear Chicago's downtown district traffic is the raising of taxi rates, according to aldermen who oppose the measures as too drastic. One ordinance would prohibit parking within the loop between the hours of 7 and 10 a. m. and 4 to 7 p. m. after January 1 and from 7 a. m. to 7 p. m. after July 1. This would leave the loop without cab stands. The companies would have to build downtown garages and rates would go up, it is said.

As matters now are, Chicago claims a first-class taxicab service at rates as low as any in the world. If the parking ordinance goes into effect it can claim also to be the only large city in the world without cab stands in its downtown district. Chief of Police Healey and several aldermen insist that the regulations should be modified.

LOOK OUT FOR KENT MAN

New York, Dec. 18—Readers of Motor Age should beware of a man representing himself as the authorized agent of the Kent Motors Corp., to appoint territorial agents to whom a car is to be sent on consignment on payment of $5. The Kent corporation has no traveling representative. Before paying any money to so-called agents of car manufacturers, it is best to communicate with the home office of the company on the matter.

WYOMING WANTS CEMENT HIGHWAY

Casper, Wyo., Dec. 15—Since the enactment of the law by which the United States government will pay one-half the cost of construction and furnish men who understand road-building to oversee highway work in the different states, a movement to build a cement highway from Cheyenne, Wyo., to the Yellowstone National Park has been started by the good roads workers of the state.

The cost of such a road is computed at $14,000,000. Of this amount the state would pay $7,000,000, and the government the rest. Not only would it be a great path for motoring tourists, but it would constitute another artery of commerce of benefit to a whole state. New Jersey on the east coast and California on the west coast accredit a large part of their prosperity to the good roads they commenced to build 25 years ago. The farm products could be taken to Denver markets by motor trucks at less than one-fourth of what it now costs by rail, it is said. The leaders in the movement would use convict labor as far as possible in building the highway and erect a cement plant at some central point in the state to be owned and operated as a state institution. The Basin country contains materials for a high-grade cement, and natural gas is available for fuel.

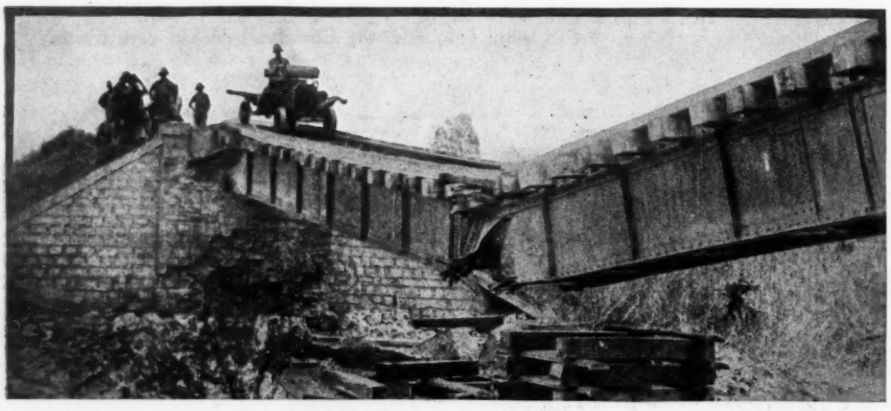
The proposed highway is of more interest to transcontinental motorists than it otherwise might be, since the new plans for the next Yellowstone National Park season have been announced. Motor cars are to be substituted for horse-drawn stages. Next summer ten passenger motor cars will cover the route of the old-time stage, and a modern cement highway from the park to Cheyenne would merely prolong the trip.

NEW ROADS DEDICATED

Chicago, Dec. 19—Dedication of Vermilion county's part of the Dixie highway under the auspices of the Illinois Highway Improvement Association began this morning at 10 o'clock with an inspection of the county's system of brick and concrete roads. Dedication ceremonies were at 11:30. Carl Fisher, of Indianapolis, and Richard J. Finnegan, of Chicago, accepted the road on behalf of the Dixie Highway Association. After luncheon at the Danville Elks' club the Illinois association held its fifth annual meeting. David E. Shanahan, speaker of the Illinois house of representatives, spoke on "Good Roads in Illinois."

PROTEST LICENSE RENEWAL FEE

Nashville, Tenn., Dec. 16—Circuit Judge Rutherford has decided that car owners are not required by law to pay a fee of $1 to county clerks for issuing a license, the question being raised in a suit brought by W. R. Long, president of the Chattanooga Automobile Club and treasurer of the Dixie Highway Association, against the secretary of state, R. R. Sneed. Mr. Long tendered to the official his application for a renewal of his license without the additional dollar for the county clerk's fee, which is regularly assessed. This was refused and Mr. Long brought suit to decide this question. The dollar does not go to the state but to the clerk. A number of clerks throughout the state have desired to appeal the case but as they were not parties to it, they are without authority and the secretary of state refuses to make an appeal. Judge Rutherford decided that the owner must pay the clerk's fee on his first application but that thereafter no fee is required. The petition that the motorist



It made no difference if the bridge was damaged, for this converted motor-lorry can travel on anything except air. It is shown crossing a bridge badly damaged by the retreating enemy in German East Africa. The bridge is on the Dar-es-Salaam railway. The motor is quite a contrivance and runs along on the tracks

be given the same number every year was denied, as it was testified that this would be a physical impossibility. The clerks have claimed that it is desirable to register the numbers with them in order that a record may be kept in the county in case of violations of law. However, police officials and sheriffs have secured such lists at little expense. The Chattanooga club has applied for authority to handle the applications of local motorists to save the secretary of state the trouble of handling individual licenses.

GERMANS ESSAY SUPER-TANK

New York, Dec. 18—Reports from the Rumanian front are to the effect that the Germans are using armored motor cars in their Balkan campaign which are more deadly than the dreaded British tanks.

From the description it is evident that so far, the Germans have not attempted to imitate the caterpillar-juggernauts of the English, but have directed their efforts toward lighter and swifter vehicles.

They are described as 25 ft. in length with rubber-tired wheels 12 in. wide. They are said to carry ten men, comprising seven machine-gun operators, a driver, a substitute driver and an officer. They are reported to have 100-h.p. engines and to have periscopes for observation purposes. A speed of 25 miles per hour is said to have been attained by them.

FISHER HEADS TRACTOR COMPANY

Indianapolis, Ind., Dec. 19—The Highway Tractor Co., capitalized at $2,000,000 and headed by Carl G. Fisher, James A. Allison and Henry F. Campbell, of this city, was incorporated here last week to manufacture tractors with 10-ton drawing power for highway and military use. Work is to be started immediately on a site of 25 acres near the Indianapolis Motor Speedway on the first unit of a plant to cost $200,000. The company expects to have the plant in operation by May 1, employing 300 men, and working on material that has been purchased for the manufacture of 5,000 tractors this year.

Charles G. McCutcheon, Detroit, Mich., will be president of the company, and Mr. Fisher will be secretary-treasurer. Plans call for the construction of a concrete and steel plant 200 by 400 ft. The tractor will feature many of the inventions of B. R. Parrott, Jackson, Mich. A. Schaaf, Poughkeepsie, N. Y., connected with the Fiat Automobile Co., and formerly manager of the Pope-Toledo Automobile Co., Toledo, Ohio, will be factory manager. Other stockholders in the company are Louis Goodhart, St. Louis, Dr. M. N. Stewart and Forrest C. Badgley.

The company announces it probably will build a tractor with a 5-ton drawing power in the near future, and later may enter the farm tractor field. The price of the 10-ton drawing power machine will be approximately $1,250.

How Long for Woman to Make Up Mind?

Chattanooga Merchants Aver 20 Minutes Too Short for Choice—Extend Parking Limit

CHATTANONOGA, Tenn., Dec. 15—Twenty minutes is too short a time for limit the parking of motor cars, as women shippers can only begin to get interested in that length of time, according to Chattanooga merchants, and as a result of this report of their observations, the city commission has rescinded the amendment to the traffic laws. The women and the merchants joined hands—figuratively, of course—in protesting against the new ordinance and the shopping district finally succeeded in bringing about the desired change. It was declared that many of the shoppers received great injury to their nervous systems because of trying to decide on the proper color and material within a third of an hour.

A number of the merchants declared also that a large number of parked cars created an appearance of prosperity which was destroyed by the inforced removal to the side streets. This argument was opposed by those who favored the short term system on the ground that it was moving vehicles only that looked well, while a long line of standing machines would cause the belief that the streets were not required for anything else. As the majority of merchants finally came to the belief that their customers wanted a longer period in which to make up their minds about their purchases, and the commissioners thought that the men who pay the high rent ought to have the deciding voice, the change was made.

RIGID TAG LAW IN DELAWARE

Wilmington, Del., Dec. 18—The Delaware state authorities, according to a notice issued by the secretary of state, is rigidly to inforce the law requiring the use of 1917 motor tags after December 31, 1916. Tags for 1917 cannot be used prior to January 1, which will make it incumbent upon any person driving a new car prior to that time to procure a 1916 license.

In addition to the regular officers, special officers will be employed throughout the state to see that the law is observed, and offenders will be arrested. This applies not only to Delaware cars, but also to those of non-residents, who are required to comply with the local laws.

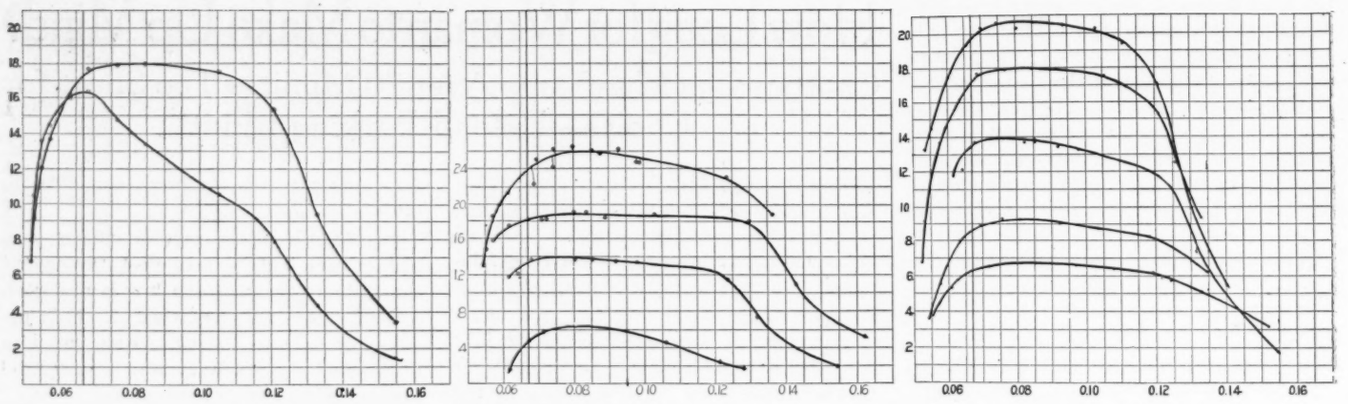
TIPSY; CAR SEEKS BAR

The usual procedure is first the bar and then the hilarity, but a certain Gary, Ind., motor car does not go by precedent; it gets tipsy and then stops at a bar. James Subin left his motor car outside as usual, when he had business indoors one day, and no sooner had he disappeared than the car began to weave its tipsy way down the street. A would-be hero was eluded with the aid of an icy pavement. A policeman got in the way, but the car refused to stop. The chase went merrily on until the runaway suddenly turned, dashed through the glass front of a saloon and lined up in front of the bar. Owing to the nature of its structure, it was unable, however, to put its pedal on the brass rail.

TO PENALIZE JAY-WALKERS

St. Louis, Mo., Dec. 18—Police Sergeant Gerk, in charge of the traffic squad, returned from the National Safety First convention at Baltimore ready to undertake a campaign for an ordinance against jaywalkers. He says reports given at the convention convinced him that it was worth while. Since the crossing lines in the congested district have been painted, the policemen have endeavored to inforce direct crossings, but lacking a penalty ordinance they have failed. Otherwise, says Sergeant Gerk, St. Louis traffic laws are as good as others and better than many in force elsewhere.

Side view of the powerful French tractor which builds trenches and constructs breastworks as it travels along. This gives an intimate view of some of the mechanism which does the work and shows French sholdiers operating the machine



Three sets of curves derived from very accurate tests to determine most efficient mixtures in carburetion, referred to as Figs. 1, 2 and 3 in following article. First curve shows the change in power due to the change in gasoline mixture, second curve shows efficiency of motor relative to theoretically perfect mixture, third curve shows mixture will vary as the load on the motor is carried

Surprising Results in Accurate Tests for Proper Mixtures for Carburetion

INDIANAPOLIS, Ind., Dec. 15 — The major portion of troubles in present-day gasoline motors is due to the inefficiency of the gas charge. At the present stage of carbureter development, thorough atomization of the gases is the thing to be sought for. The engine designer and carbureter manufacturer should know in figures, not by guess, what is the proper amount of heat for the mixture, and what is the correct mixture for idling, and for speed. These points were brought out in the papers, and the discussion which followed at the December meeting of the Society of Automobile Engineers, which was held tonight in this city.

Professor Berry, of Purdue University, in his paper enumerated the three requirements that appeared to him a carbureter should meet in order to give perfect performance. These requirements are: A good mixing valve—that is, the gasoline should be very thoroughly atomized; second: The proper amount of heat must be given to the mixture; and third: The kind of mixture for idling or for speed must be known.

In describing very rigid tests which were conducted with a view of determining the factors which control these three requirements, Professor Berry spoke as follows:

Accurate Carburetion Tests

We had a six-cylinder motor with the intake manifold inside the motor, and I feel that even though it did have a more or less hot manifold, the situation was helped by the manifold being heated, and watching the gases that passed out. It helped with a dry manifold, and gave a satisfactory performance under circumstances which were adverse. We used a motor generally accepted as giving very fine firing in regular service. We ran this test at 400, 700, 1000, 1300 and 1600 r.p.m. with 100 lbs. on the brake at full load. We ran it with one-fourth load, one-half, three-quarters and full load, at each condition, say at 1300 r.p.m. and 50 lbs. brake load, we changed the mixture in the carbureter arbitrarily by changing the gasoline needle valve until the mixture was very lean, and kept increasing it until we got the engine running under the most powerful mixture, namely, until we got the point where the mixture would not increase the power of the motor at the same opening of the throttle.

After we got to 1300 revolutions and 50 lbs. brake load we kept the throttle opening the same and changed our brake load so as to hold the speed constant. We had the apparatus so arranged that we could weigh our gasoline to one one-hundreth part of an ounce. We metered the air and the vacuum and humidity of the air were recorded, so we made an attempt to find out just how much dry air was made in each case.

At the time it came to a balance it rang a gong and started a revolution counter on the end of the shaft and then we took off the weights. Then, when it was balanced again it rang the gong, stopped the watch, and we knew the amount of air within 1 per cent, and knew the amount of gasoline to one one-hundreth part of an ounce. We recorded the amount of air, the temperature pressure and humidity, the amount of gasoline used, and power developed, and then made a run.

We increased the mixture and got point No. 2 on Fig. 1 and made a series of tests, increasing the gas in the mixture until the engine would no longer run. This curve shows the change in power due to the change in gasoline in the mixture. It showed .05 lb. of gasoline per pound of dry air up to 16/100 lb. gasoline per pound of dry air. We have very accurate figures. The perfect mixture is .0671 lb. gasoline to one pound dry air.

The power is not quite maximum at the theoretically perfect mixture, for the range of mixtures you can get good power at .06 and still get good power at .12. You can double the amount of gasoline in the mixture and still carry almost full load, and I was unable to train myself so that I could stand beside the motor and tell in what range the motor was running best. I could not tell by sound whether the motor was running on the lean or the rich end; it was simply running nicely and smoothly. I could not have told by smelling the exhaust. This shows the range of mixtures you can carry.

The next point is the effect on the efficiency of the motor. See Fig. 2. In all of these curves for all running conditions, we have found that the maximum efficiency seemed to be exactly at the point of the theoretically perfect mixture. Below perfect mixture the efficiency dropped off. As soon as you increase above that the motor drops off. If your power were straight here this would be a parabola and as you come to the breaking point the power drops off and you get another break in the curve and it drops down more rapidly. This will explain why of two motors in the same factory, of equal flexibility, equal snap, equal hill-climbing ability, and with the same carbureter, one will get 10 miles to the gallon, and another 15. It is because of the adjustment of the carbureter.

In the second curve the load was constant. This is 400 and you see why at .08 it drops off and runs down to the well. As you speed up you find you cannot run on quite as rich a mixture, you cannot overload the engine quite so much, that is, though your possible mixture ranges are wide at higher speed, they are not quite so wide as to lower speed.

In this last curve it shows you how the possible mixture will vary as you vary the load on the motor. I was carrying 1000 r.p.m. and this was at one-quarter, one-half, three-quarters and full load. At one-quarter load you cannot carry such a mixture as at higher load. At this low load we carried quite a high vacuum on the intake manifold and did not get very high compression and were not able to explode as poor a mixture as at higher compression. At one-half load you can operate successfully with a little richer mixture and at full load, still richer. Its extension is both ways. In other words then, as you increase the load on the motor or the compression on the cylinder, it seems to widen the range of mixture which can be successfully exploded.

The data shows for idling conditions, you can get your motor to run along smoothly with as wide a range of mixtures as you can carrying a load. These figures in all cases were mathematically figured out. This is horsepower actually figured and not just approached.

One qualification of this is that when running with a mixture which is rich, you carbon the cylinders rapidly, and we did not check at the rich end of the curve because we did not want to run the motor too much on the rich mixture. I did not feel it a point of very great importance to know the exact shape of these curves. A man does not care how rich a mixture he can run with, but how lean and at the same time get good power.

We wanted to know how much effect it would have on these curves when using a partially wet manifold. A wet manifold would favor one cylinder, giving it more gasoline than it would another, and in such case it would not be able to run with as lean a mixture with a wet manifold as with a dry manifold. The only effect I could see that a wet manifold would have on the results here reported would be if you had a dry manifold it would extend these curves in both directions a little bit.

Power Output and Mixture

Pertinent discussion on this paper came from A. P. Brush of the Brush Engineering Association, Detroit, and F. E. Moskovics of the Nordyke & Marmon Co., Indianapolis, Ind. Mr. Brush asked Professor Berry's personal opinion as to the reason why the maximum power output is not coincident with the theoretically perfect mixture. Also, at what point in the enriching of the mixture, sooting of the spark plugs began to appear. Professor Berry replied that, regarding the first question, it would be a matter of opinion, and by the fact that the mixtures were not uniform

and a little excess gasoline would not cut down the power as when the mixture is lean. The gasoline runs around the manifold in semi-liquid form and would be thoroughly mixed with air and only partially burned. His opinion is that sooting of the plugs is especially pronounced at the very last end of the curve where the power is away down and excessive when it begins to miss, at which time the sooting gets higher on the plugs. Mr. Moskovics asked if there had been any attempt made to analyze the exhaust of the various mixtures. Professor Berry stated that they were not analyzed.

Quoting from the paper delivered by F. C. Mock, chief engineer of the Stromberg Motor Devices Co., Chicago:

Our present motors have not changed from their original design which was to operate on gasoline vapor, but our fuel has changed so we cannot always have gasoline vapor and I think a great part of our trouble in motor operation is due to inefficiency in the gas charge.

If the fuel is introduced into the motor in other than vapor form we encounter a number of difficulties. First: Peculiar to multi-cylinder motors is the practical impossibility of conducting the liquid gasoline from a single carbureter or discharge point, to the different cylinders in exactly equal quantity. If the gasoline were in pure vapor form, or in such small drops or particles as to be wholly air-born, it would respond to the successive suction of the individual cylinders exactly as does the air, but when portions of it are allowed to gather in liquid form in the manifold or to spatter on the walls at the bends, the farthest flow can scarcely be controlled, and some cylinders inevitably get a great deal more of the liquid part of the fuel than others, regardless of the care given to the distribution in the manifold design.

Another difficulty of equal importance involves the time element. Motor car use requires that the motor vary continually in speed and torque, and these variations are universally controlled by regulation of fuel supply by means of a throttle valve at the entrance of the intake manifold. When the position of this throttle valve is changed the air flow through it responds almost instantaneously. But, if the corresponding gasoline supply after leaving the carbureter, collects on the intake manifold walls, its flow to the cylinders is greatly retarded. As a result we have the condition that on quick throttle openings, the gasoline supply to the cylinders lags behind the air, giving a temporary lean mixture to the cylinders, and conversely as the throttle is closed it tracks in the manifold on the way to the cylinders, a quantity of gasoline, more than necessary to take care of the air therein, so that the mixture is very rich as the motor slows down.

Vapor Density Limited by Volatility

The density of the vapor of any substance is limited by its volatility as generally expressed by its vapor-tension curve and by the temperature. Now, with liquids with such low volatility as kerosene, for instance, the vapor in the cylinder even after compression may be too rare to permit of flame propagation, under the cylinder temperatures common in the closed throttle driving on passenger cars. This, I believe, is the great difficulty which stands in the way of the use of kerosene as a passenger car fuel. We have, to a certain extent the same difficulty with the low grade gasoline of today when the motor is very cold. It is necessary to have a strong spark and to nurse the air supply very carefully before the first few explosions can be obtained, when cylinders are 32° F.

It is impossible for all the gasoline to enter the motor as vapor under certain conditions of running, and it might be interesting to state just what becomes of the unevaporated part so far as we have been able to observe by the use of glass carbureters and glass windows in intake manifolds.

With the motor idling in most carbureters, the suction on the jet is somewhat lower than at ordinary driving speeds and the gasoline therefore leaves the jet at quite a low velocity and in fairly large drops there being no action of evaporation perceptible. As these drops pass the throttle however, a remarkable change takes place in their size and condition, due to the fact that the air is going through the throttle orifice at a velocity greater than sound, the vacuum of 8 to 9 lbs., which exists in the intake manifold when the motor is idling. As a result, the gasoline is torn into very fine spray. Even so, if no hot air is used with the carbureter and no heat applied to the wall of the intake manifold, there is a certain amount of condensation so that the walls show moist.

When a motor "loads" idling, this cause is always below the throttle in the carbureter. The gasoline drops do not leave the jet with sufficient rapidity to fly all the way up to the throttle or strike some obstacle upon which they gather and drop back, so that the lower space of the carbureter tends to puddle full.

As we open the throttle the suction of the jet becomes greater so that the gasoline comes off in small drops, but the vacuum above the throttle gets lower so that less atomization takes place at the throttle orifice. As the density of the gasoline vapor is increased more liquid becomes visible on the manifold walls, and the mixture which previously on idle was in the form of a barely visible mist begins to show tiny drops.

As we open the throttle wide a remarkable change occurs in the appearance of the mixture. There is scarcely any mist or vapor present and the particles pass along the intake manifold without diminishing from their size when leaving the jet. They then impinge either upon the carbureter walls or a bend in the manifold, and tend to remain and cling to the walls in liquid form, thence being carried along the air passage by the air friction alone. As they pass along they drop to the bottom of the air passage, sometimes gathering ¼-in. or more deep if the manifold is of poor design.

Answering the request of C. S. Crawford, Premier Motor Corp., Indianapolis, J. W. Esterline, Esterline Co., Lafayette, Ind., told of tests that had been made in burning of low-grade fuel. He said:

It is simply a division dealing with the low grade of fuel and that is the part of it we have investigated; the probability of burning a low grade of fuel in the form of gas rather than in the form of vapor. We ran a tour on several cars with kerosene and fuel oil, and we went around the Indianapolis speedway at 50 m.p.h. on some crankcase oil that a racer left in a can out there. The entire investigation we conducted is on the problem of converting any kind of low-grade fuel in the form of a gas—running the motor car engine as a gas engine.

We succeeded in producing sufficient gas at a uniform pressure at sufficiently low speeds and at sufficiently high speeds to operate the motor under practically all conditions of running. One car was run 3200 miles, and was clean at the expiration of the test and the cylinders looked as though they had been polished inside. There was no residue left from the crude oil.

There was no difficulty in getting the motor to fire. There was no smoke and no smell. The efficiency was higher when the motor was running on a gas mixed with air than when running on vapor mixed with air. In one case we used gasoline with a proper carbureter and taking low-grade fuel got anywhere from 15 to 20 per cent more mileage out of the lower-grade fuel burning it as a gas. In most of the work which we did we used the exhaust heat of the engine for producing gas and the only problem we met was getting a production of gas proportionate to the requirements at all times.

We drove probably a total of 7000 or 8000 miles with the four different cars.

Car Makers Must Aid in Defense

Coffin Urges Manufacturers to Give Government Aid

DETROIT, Dec. 15—That motor car manufacturers must aid the United States to prepare for self-defense was the thought expressed in the address made by Howard Coffin, a director of the Hudson Motor Co., to manufacturers and other guests of the Society of Automobile Engineers at their annual banquet here last night.

Battleships which are made in 18 months in Europe require from 3 to 4 years for manufacture in the United States, and the aeroplane division, the annual appropriation for which was recently increased from a few thousand dollars to $14,000,000, is sadly in nede of men, tools and machinery. Unless the makers and engineers of the motor car industry throw their knowledge and industrial resources into the work little will be accomplished for several years, says Mr. Coffin. He spoke of the proposed Lincoln airway, which is to be an air route over the Lincoln highway from coast to coast.

About 400 members and guests attended the banquet. Motion pictures, artists and speeches formed the entertainment. W. K. Zimmerschied was toastmaster. Among the speakers were D. McCall White, Detroit, who introduced Russell Huff, president of the S. A. E.; Coker F. Clarkson, general manager of the S. A. E.; Job Hedges of New York; Capt. L. E. Goodyier, Jr., of the aviation service; and H. M. Leland, president of the Cadillac Motor Car Co.

WANTS LICENSED GARAGE MEN

Detroit, Dec. 18—Representative Charles W. Clark of Michigan, thinks that garage men should pass a state examination before a board of motor car engineers, and he is planning to introduce a bill into the state legislature to provide for licensing of those employed in motor car repair work.

"Some of the garages employ men who do not know whether the tail light should be placed on the radiator or the windshield; yet they are permitted to work on cars costing thousands of dollars," says Mr. Clark, "and I believe the license fee would pay the cost of the examination and such a board would be self-sustaining. In any event it would be a boon to the motorists and the motor industry of Michigan."

Inasmuch as every member of the legislature is a car owner it is believed that he has an excellent chance of getting his proposed bill passed in the next session.

TO CHANGE COMPANY NAME

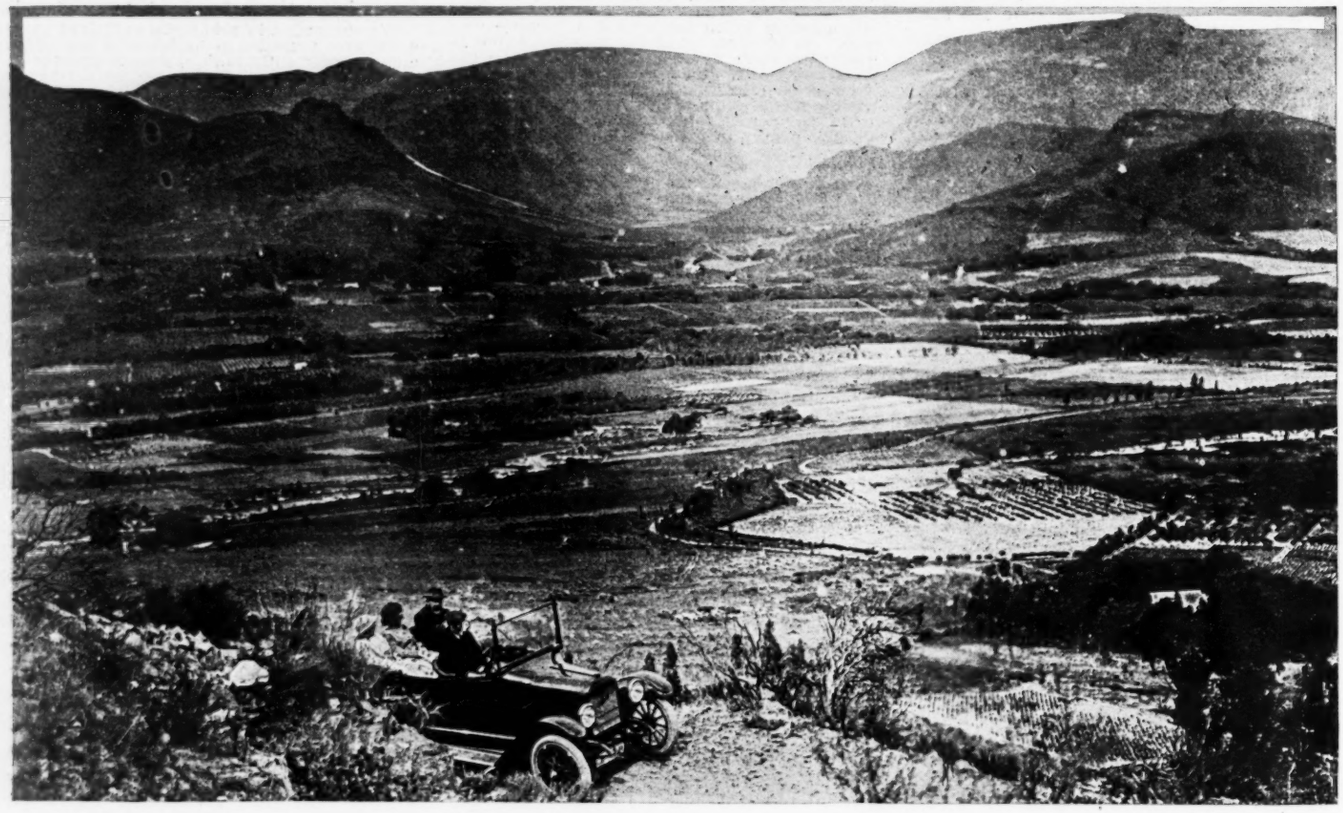
Detroit, Dec. 18—The Fostoria Light Car Co. stockholders will meet January 8 to reorganize the company and elect new officers, besides changing the name of the concern to the Seneca Motorcar Co.

HERZOG SUES WHEELER

Detroit, Dec. 18—Frank H. Wheeler, Indianapolis, has been sued by Phillip W. Herzog, Minneapolis, receiver of the Twin City Motor Speedway Co., for $240,000. Mr. Herzog states that Mr. Wheeler subscribed the accepted 2,400 shares of the Twin City Motor Speedway Co. and though the receiver made demands for payment for the shares Mr. Wheeler refused and neglected to pay. The complainant demands full payment for the stock on a basis of $100 a share and asks that the costs be assessed against the defendant.

War Motorized in B. S. A. Also

Dealer Credits Motor Cars with Success of British Campaign Against German Colony



This gives a glimpse of French Hoel valley, which is not far from Cape Town in the extreme south of Africa

EDITOR'S NOTE — William Campbell, Maxwell dealer in Johannesburg, B. S. A., has just returned from an extended visit in the United States and Canada. Mr. Campbell is one of the large motor car distributors of that far-away city, but keeps closely in touch with all car developments in Europe and the United States.

By William Campbell

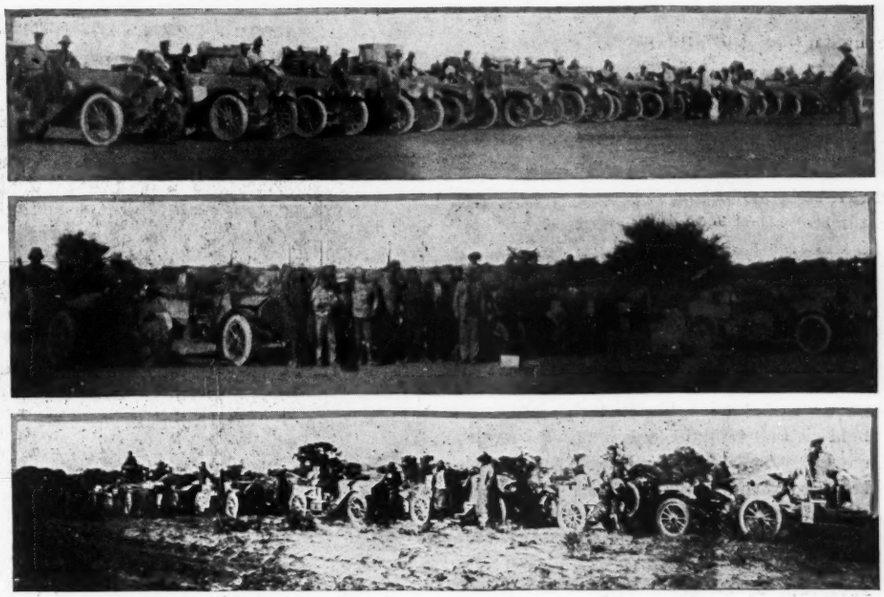
JOHANNESBURG, British South Africa —The use of motor cars in the present war is not all confined to the continent of Europe, for British South Africa has used cars under probably greater difficulties than those along the French and Belgium front. The success of the British campaign against German Southwest Africa was entirely due to the ability to cross the desert by motor car.

But for the adoption of the motor car to modern warfare, brilliant as was the mind which conceived and so quickly brought to an issue that first campaign, German Southwest Africa, it could not possibly have been accomplished either so quickly or with so small a sacrifice of human lives. To enable the reader to understand it better, let us briefly outline the conditions. On its hundreds of miles of sea coast the principal towns and rich agricultural country of this German colony were protected by an arid stretch of sand desert some 50 to 60 miles in depth. On the other side, where the German territory abutted on Cape Colony, nature had

A pause for rest—the British forces used cars to cross the desert to German Southwest Africa. Both sides attribute the success of the British campaign to this means of transportation. The German colony was protected by an arid stretch which was thought to be impassable by motor car even

provided an equally forbidding and barren stretch. Something of the difficulties to be surmounted may be gathered from the fact that a large column of motor vehicles had to be mobilized for water transport alone, and it is estimated that every gallon of water so delivered to man or animal cost the government 10 shillings and sixpence, $2.50. Doubtless this gave a feeling of security to the Germans, but it proved their undoing. They anticipated and prepared for attack from the sea, but so confident were they that the interior was impassable to motor car or horse that after one of the first small engagements a captured German officer declared his belief that only by laying a lumber track all the way was it possible for the motor car to get through. This was not done, however. Instead, the dry bed of what was once the broad and mighty Kuruman river, a stream which now disappears into the earth 7 miles from its source, was utilized. By this dry bed General Berrange and his force entered, and so surprised were the enemy that, forsaking their entrenchment and forts, they fled north and with their main forces ultimately were surrounded. In this war, as in the rebellion and the present campaign in East Africa, American motor cars, because of their power and lightness combined with ability to negotiate sand, played an important part—Maxwells, Reos, Hubmobiles and Fords figuring chiefly.

To understand South Africa, its present and the great possibilities of its future, you must visualize its vast distances—3,000 miles from the Cape to Northern Rhodesia, 1,500 miles from sea to sea—its sparse population capable of the purchase of luxuries — only 1,250,000 white persons — its mineral wealth with an annual export of gold worth $170,000,000; of diamonds worth $70,000,000; and smaller amounts in the baser metals—its already large and important exports in wool, skins, ostrich feathers and fruits. Then add to this its more than remarkable advances in agriculture, with a climate capable of growing both wheat and cotton. The country is rapidly becoming a dairy and cattle-raising country, and this change is fostered by a government which not only recognizes the value of the farmer and the miner in its development, but is prepared to spent money with a view to the future.



These photographs show the British forces in the German Southwest Africa campaign. One fleet of motor vehicles was mobilized for water transport alone. The scenes are typical of the desert that was conquered by the British soldiers, with the aid of motor cars

This strange looking accessory of a tree in German Southwest Africa is the fashionable home of the society bird peculiar to that region

The quartermaster's stores were kept in a tent under a tree while the British campaign was being waged in German Southwest Africa. The tires piled outside give some idea of the size of the motor vehicle column used

The government railway development has been rapid, but as in the United States, the problem of good roads is one whose very vastness is apt to be overwhelming. In fact, outside the towns and suburban areas there are no roads, only rough tracks unmarked and practically neglected. Hence has come the opportunity of the American motor car with its light weight, flexibility, high clearance and moderate price. That opportunity has been increased greatly by war conditions in spite of the high price of gasoline—84 cents a gallon—and the additional handicap that, owing to high freight and duty, a car has to be sold at considerably more than double what the American owner pays.

More is expected by the owner from his car. It must, as a daily experience, take with ease gradients that are not often met with in the States. It must ford rivers and be absolutely dependable in this, as one cannot risk having to foot it for assistance when the nearest homestead or town may be 5 or 10 miles distant. As for sand and rough veldt, or prairie, or a steady climb of 2,000 to 3,000 feet, that is expected of any car as a matter of course. It, therefore, says much for the motor car engineer that not only has he fully met the complex problem, but that the demand

continues to grow in spite of the neglect and misuse too often given the car by its owner.

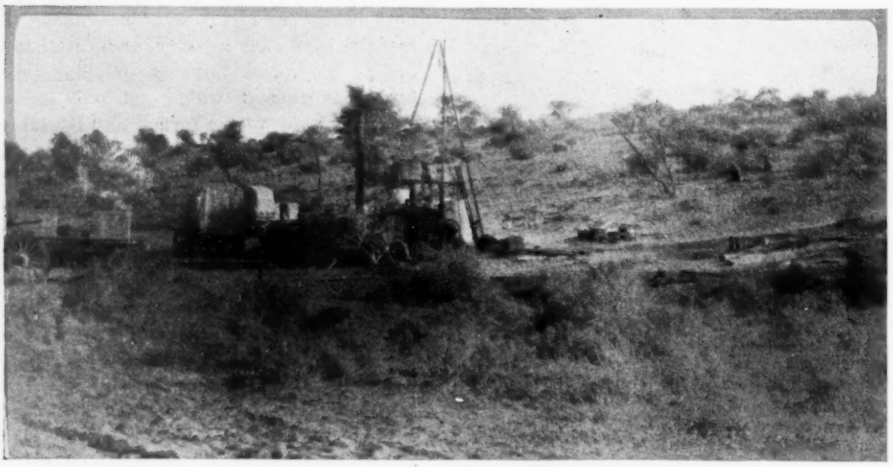
"Modern" and "progressive" are words that can be applied with truth to the South African dealer. To the pioneers of the industry it was at first often a heart-breaking experience, a great risk in capital and effort without result. Their problems were frequently peculiar to local conditions, and their limited market in the early days made the manufacturer consistently indifferent to their suggestions. What they considered and knew to be necessary for their market the maker looked on as a fad or non-essential. That they held on and triumphed is a tribute to their quality. Today they are the compeers of their brethren in more favored countries, pushing and capable with up-to-date garages, competent workmen, modern equipment and service second to none.

Prospects of Future Trade

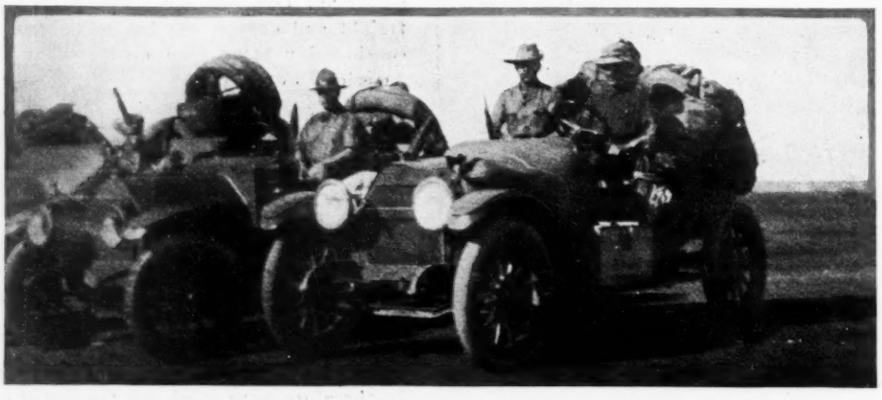
The market is an increasingly difficult one to break into with a new make. Some even of established names have prejudiced their product by frequent change in chassis or model. It should be remembered dealers that are more than 6,000 miles from their source of supply cannot afford to take the risk of ventures that have not behind them the elements of permanency or take the trouble and risk of carrying a stock of parts to meet the demand of numerous and varied models.

Tours of 2,000 and 3,000 miles are possible for the motorists. Comfortable and modern hotel accommodations make it possible to make these trips by short stages, if so desired. This photograph was taken at Muller's drift, Johannesburg

After the war, what? British makes are bound to become a serious factor, but so far no English manufacturer is featuring a really cheap car. Above what you know as the $1,000-car, the future, so far as the British colonies are concerned, is with the English manufacturer. He will re-enter the field with some great advantages—the war has accustomed him to quantity production, his factories and equipment have been tremendously enlarged at practically no cost to himself. And he will have in his favor an intensified sentiment, for "British-Made" will have a new value, and sentiment counts more than we care to admit. He has learned new wrinkles from his war experience, he has accumulated capital, and markets wait for him.



So difficult is it to transport water across the desert in German Southwest Africa efforts, such as shown here, are constantly being made to strike water by boring



The mails also were transported by motor. These soldiers are just leaving Kimberley. American makes play an important part, as their power and lightness is combined with ability to negotiate sand

Of the country itself, what shall we say? With a climate varied enough—from temperate to sub-tropical—to permit the cultivation of all classes of produce, it is ideal for motor car touring and the traveler, no matter what his taste may be, can have it satisfied. Starting from Cape Town, the natural port of the sub-continent, ideally placed under the shelter of the famous Table mountain, he there can begin an historical survey of the country at the scene of the landing of its early Dutch discoverers, trace the progress of civilization and with it agricultural wealth—discover how deep a mark the Huguenots, fleeing from religious persecution, have left upon the colonies, follow the footsteps either of the early Dutch pioneers as they resolutely pushed inland or the British settlers as they advanced along the east coast, mark the influence and acceleration of development that followed the discovery of mineral wealth in the form of gold and diamonds, visit South Africa's historical battlefield, concluding his holiday amid the subtropical scenery of our garden colony, and reach the shores of the Indian Ocean at Durban, our great seaside resort and large import center.

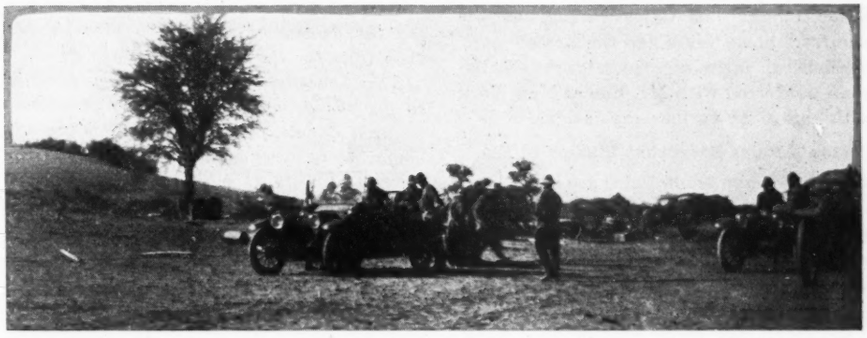
Such a tour may extend from 2,000 to 3,000 miles and can be done by short stages, as the traveler is sure to find comfortable and modern hotel accommodations even in the smaller towns at a cost so moderate as to surprise. Along the coast line he will find a belt of comparatively low-lying land, agriculturally rich and highly cultivated. Here he will find an

agriculture which ranges from corn to tobacco, from grapes to bananas, which includes not only cattle-raising and dairying, but the growth of wool and ostrich feathers. In rising to the high table lands of the Karoo, Free State and Transvaal he will find steady climbs of 3,000 feet and more, which will severely test the qualities of his motor car. He need not hesitate on that score, however, as many of the illustrations which accompany this article were taken by the writer on a like tour of 1,826 miles.

Once the motorist has surmounted these mountain passes his task is an easy one. He may find a difficulty in deciding which road or track to take, but an inquiry will keep him right. The scenery has changed entirely during recent years and best can be described in the words of an American visitor as "a mighty fine clearing." The absence of trees and the monotony of the flat will be more than compensated for, however, by the exhilaration of the mountain air and the peculiar charm of the veldt at sunrise and sundown.

The visitor will do well to visit Bloemfontein and then cross to Kimberley and examine the wonderful diamond mines before proceeding to Johannesburg, the center of the largest gold-producing area in the world. The industry, the growth of a matter of 30 years, will surprise him, so will the town itself—modern, prosperous and with much of the hustle characteristic of American city life. A day can be given to Pretoria, the seat of the government administration, as Cape Town is the parliamentary center. The visit might be concluded by a tour of 480 miles, descending again to the coast, passing through a new and more luxuriant type of vegetation, a more undulating country and again reaching the coast at Durban, where East and West meet.

The British mail delivery in Africa is not so far different from that of Uncle Sam, judging from this photograph



During the campaign the motor car was about as prominent as the soldier, and is indispensable for British success

There is some doubt whether this could be called a modern bakery, but it is how British soldiers baked their bread

FULL TIME LICENSE REQUIRED

Louisville, Ky., Dec. 14—The old interpretation of the Kentucky motor vehicle license law, whereby the license fee was placed on a pro rata scale for the number of months the car had been used, has been discarded and the latest construction by Attorney-General M. M. Logan requires the motorists to pay the full license fee the full year round whether the car is used or not.

Cards mailed from the office of T. M. Byars, commissioner of motor vehicles, notify motorists of the new opinion of the attorney general and read:

"For the last year or two the motor license law has been construed as not requiring the payment of a license after the expiration of the license issued and before the owner operates his machine. This construction of the law has led to interminable confusion and has opened a door through which many have escaped the payment of a license justly due.

"I beg to advise you that where a motor vehicle has been licensed once and application for another license is made for the succeeding year, you should require payment as if the application had been made on the first day of January. The license is against the owner of a motor vehicle and the owner cannot escape the payment of a license by not using his machine for some portion of the year. He must pay straight time after he becomes the owner of the machine until he disposes of same."

HASSLER BUILDS CAR PLANT

Indianapolis, Ind., Dec. 15—Robert H. Hassler, Inc., manufacturer of motor car accessories, yesterday announced the completion of a modern manufacturing plant on a 6-acre site which will be occupied by the recently incorporated Hassler Motor Co., which has a capitalization of $200,000. The new company, which expects to be in operation shortly after the first of the year, will manufacture a motor car of medium price, which will be placed on display for the first time at the Chicago motor car show in February.

Officers of the company are Robert H. Hassler, president; Edward D. Fouts, vice-president; David G. Ong, secretary and general manager, and James A. Hittle, production manager.

TO BUILD TOLL ROAD

Topeka, Kan., Dec. 15—The Auto Traffic Co. of Fort Scott, Kan., capitalized at $50,000, was granted a charter recently by the state charter board of Kansas. The company is organized to build and operate motor roads—running its own vehicles on the roads for hire and charging toll of vehicles owned by others. The first road is to be built, it is announced, between Fort Scott and Pittsburg, 32 miles.

Boston Has Individual Traffic Problem

Hub Expert Points Out Reasons Why New England Metropolis Cannot Hope to Make Its Rules Harmonize With Those of Cities Laid Out on Checkerboard Plan — In Many Respects Its Ordinance Is Similar to That Advanced by William Phelps Eno and Motor Age

"WHENEVER anyone advances standardized traffic regulation for large cities they should exempt Boston unless they know all about our street conditions," said John O'Callaghan, for many years secretary of the Boston Street Commission. He has made an extensive study of traffic in the big cities throughout the country. Some years ago the Boston Commissioners, including Secretary O'Callaghan, conferred with Mr. Eno at New York with regard to various regulations.

Boston's Rules Somewhat Similar to Eno's

In the Boston traffic rules are some ideas of Mr. Eno's. In his rules are some that may have been suggested by Boston's code. According to Mr. O'Callaghan the Eno system is admirable for cities that are laid out like Philadelphia, Cleveland, Washington, the upper part of New York, also Chicago. With Boston it is entirely different.

"Boston's streets are narrow," said Mr. O'Callaghan, "but on our streets have been built business houses so that if one were to suggest cutting a slice off Washington street it would take away much of the area some firms occupy, perhaps force them to move somewhere else at a tremendous loss. The land value would be enormous, so much so that it would burden future generations. By the time the bonds were paid off Boston would be congested again, perhaps as badly.

"We have given a great deal of time trying to make conditions better. For example we have a number of one way streets that keep vehicles moving in one direction only, and vehicles cannot stand for any great length of time to block traffic. The coming of the motor car has made a very difficult problem. In the business section of Boston downtown there are no garages, so many owners parked their cars in the streets outside their places of business. When too many cars were left there, some in front of other people's property there came kicks, and so we had to forbid this practice.

"In Boston there seemed to be two places downtown adapted to the parking of motor cars, State street from Custom House to Atlantic avenue, and Post Office Square, but in recent years an entirely new business grew up here, the exchanging of express freight. Formerly the expressmen used to meet at any old place and swap their packages going to different suburbs. This had to be stopped so they were given lower State street and Post Office Square. Now in those places it would be possible to park about 100 cars. To try to oust the expressmen would be a blow at business.

"We hunted and hunted for places. Finally we allowed cars to stand around the Common for varying periods. That helps somewhat, but not very much. We found a new place on Boylston street where there is room for about fifty cars, and recently we made that a parking space. Park Square was considered, but the monument in the center takes up a lot of room. Up town in the motor district it does not matter for the streets are wide and the problem is not acute.

"When the traffic problems were considered we were asked to make a hard and fast rule that all motor cars should be stopped 5 or 8 feet behind a street car, or should not pass within 5 feet of a car going in the same direction. On Washington street in the shopping district when a motor car passes a street car there is about room for one person between the two vehicles, sometimes not that space, even though the motor car is hugging the curb. If we made motor cars stop every-time a street car stopped there would be a never-ending jam.

"Realizing conditions during the holiday season we have just ordered all street cars off Washington street between Essex and Franklin until January 13, if not later. There has been a suggestion that all motor cars used merely for shopping be excluded from the district, but we have not gone that far. We have now planned to route vehicles in a series of general direction in that district for the time being to see how it works out.

Safety Areas Considered

"The problem or safety areas has been considered. Yet it is not possible to place them where they really would be needed on Washington and Tremont streets. The streets would not be wide enough for safety posts for islands, and other vehicles unless the street cars were limited to one track, and all went in the same direction. The passing of street cars on the right or left was also considered. That could not be taken care of down town. In the uptown places where there are reservations for street cars in the middle of the road all vehicles are kept on the right of the street cars in the direction the latter are traveling. We could not inforce that down town without blocking traffic every few feet.

"We have evolved a rotary system at Haymarket Square that works out very well for there is room for it. All cars coming down Sudbury street must swing to the right around a circle instead of cutting across the square. Those going through Washington, Canal, Blackstone and Friend streets must do the same. It is working out very well for there is an ideal chance to inforce the rule. In some other sections of the city we have put up some posts, keep-to-the-right signs, to divert traffic, with good results.

"Our board had several consultations with the police department on the use of semaphores, but the police commissioner did not look favorably on them. We tried out one on Tremont street, and it was knocked down before it got a real test. It was never put up again. The commissioner believes that the policeman is more efficient using his arms. He does not believe in using whistles, and it has never been tried at Boston.

"In our regulations we provide that vehicles shall not cut corners when making a turn from one street to another. If anyone were to take up our book of traffic regulations and compare them with the Eno code there would be a great similarity noticed. In each article of the Eno traffic ordinance one finds nearly the exact

SIGNALS

PITTSBURGH, Pa.—Editor Motor Age—The slower the traffic the more important it is that it should give warning of a turn to the left, because it is only slow traffic that is frequently passed by other vehicles. Therefore, it is far more important for the drivers of wagons to give signals than it is for the drivers of motor cars.

Now honestly, it does not seem possible to get the drivers of wagons to give complicated signals, for, as a class, they are not magazine readers, and the police are apt to be lenient with them, because they are a part of the labor vote. If we get them to hold out a hand, preferably the right hand, so that it can be seen by those back of the wagon, the driver sitting on the right, we shall be doing all that can be expected.

If we cannot appeal to the drivers of horse-drawn vehicles through the pages of the magazines, why not let the local motor clubs tackle this work by short talks giving the reasons for this signal in the newspapers and by signs placed on the street corners or on country roads, with the permission of the police authorities, whose work they would be assisting?—Murray Fahnestock.

Nashville Streets Narrow

Difficulty in Using Semaphore Explained by Police Chief

Accidents Have Been Cut 30 Per Cent in 1 Year

CHIEF ALEX BARTHELL, of the Nashville, Tenn., police department, has expressed hearty approval of the movement for traffic regulation standardization recently started by the Motor Age, the adoption of many of the rules suggested having been marked by a decrease in the number of accidents.

"About 2 years ago we adopted a rigid traffic code, which we have been inforcing," said Chief Barthell. "The first year the number of accidents was cut 30 per cent. While we have not made the comparison for this year as yet, there has been a noticeable improvement; in fact, there has not been a serious accident in the central part of the city for a long time.

"Traffic conditions in Nashville are especially hard to handle as this city has the narrowest streets of any city in the country with the exception of Boston. At one of the most important intersections, there is not enough room to put up a semaphore and the man at this corner must use his arms constantly. There are a large number of street car lines converging toward the transfer station and as there also is a heavy vehicular traffic, it is congested throughout the day. We plan to eliminate this by making it one of the one-way streets, which we expect to put into effect shortly. In this way, motor cars will be able to pass cars on either side instead of having to follow them. It will also make it possible to stop vehicles on either side, instead of on one side only as at present. The present situation is unfair to the merchant on the side on which stopping is forbidden so that I do not believe there will be any objection to the change.

"We have a 20-min. parking rule and while we inforce it generally we have found that the traffic men must use judgment. There is only one street in the central part of the city where cars may be parked, this being Capitol boulevard, a short, wide street from the main artery to the state capitol, and we have no central garages, so that the average business man may have to leave his car a quarter of a mile from his office. For a real-estate man, a physician or other man who needs his car close at hand, this may be a hardship and while we have no desire to show favoritism, we must permit such men to park their cars close to their offices.

Cut-Out Not Generally Useful

"The prohibition of the use of the muffler cut-out is an important feature of traffic regulation, because its use not only adds to the noise unnecessarily but also is damaging to street pavements. I have driven a car for a long time and have never found any need for its use, except in the garage when having some repair work done on the car.

"The suggestion that every policeman be instructed to inforce the traffic laws and to call attention of motorists to violations is an admirable one. We have given all our men these instructions and this has resulted in more general obedience to it."

Will Seek Uniformity

Phoenix, Ariz., Asks That Traffic Changes Embody Eno Plan

Advocates Parking of Motor Cars With Rear End to the Curb

"THE uniform traffic law is the only law," declares George O. Brisbois, chief of police of Phoenix, Ariz., after a careful study of proposed standardized traffic rules as outlined in Motor Age. "I have carefully considered the Eno system as set forth in Motor Age, and have transmitted it to the city attorney with the suggestion that any changes in our traffic ordinances be made to conform with the uniform system."

Different traffic rules in each town and city are an endless source of confusion and trouble to tourists, and lead to no end of annoyance in inforcing the traffic ordinances in Phoenix, according to Brisbois. "We have a great many tourists here," he said, "and the sooner all cities have a uniform traffic ordinance, the less trouble and confusion will attend our inforcement of the traffic ordinances here. In a large number of cases tourists make the excuse that they are ignorant of the local ordinance, or that it is entirely different from the ordinances in their home town or in the last city they visited."

Brisbois believes that cars should be parked with the rear end to the curb, owing to the danger of accidents in allowing cars to back out into a crowded street. In all other respects he agrees with the provisions of the Eno system.

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language as that used in the Boston traffic code. So we have a general agreement that it is a good one. If all cities were laid out on the checkerboard plan it would be possible to have the ordinance exact throughout the country.

Uniformity Worth Working For

"Where so many cities can adopt the plan it will mean making it much easier for the motorists traveling about the country. So we are in favor of anything that will tend to uniformity when conditions justify it. The great trouble is in inforcing all the rules. There is hardly one regulation that is not violated repeatedly day after day by drivers of teams and motor cars, and few are ever checked. As a matter of fact it is reasonable to believe that a lot of drivers of vehicles know little or nothing about the regulations, and they merely depend upon signs telling them what streets are one way thoroughfares.

"The plan of cross-walks is an interesting one. Just now in Boston the public works department in laying new pavements is eliminating crosswalks, yet a lot of people depend upon them as they feel safer when on the crossings. Why it is being done I do not know. Later on it may be possible to paint lines for crossings. The legislature was asked to pass a law to make people keep to the crosswalks, but Police Commissioner O'Meara opposed it unless the police were given authority to make arrests without a summons. The legislators quailed at passing a law that would lead to their wives, sisters or mothers being dragged to a station house and locked up with drunkards, criminals, etc., for stepping off the sidewalk in the shopping district, a word picture painted by Police Commissioner O'Meara that showed the futility of it in the cow-path streets of Boston.

Layout of Cross-walks

If crossings are to be designated for pedestrians it seems that if they were a little back instead of right at the edge of intersecting streets it would lead to minimizing accidents. Then pedestrians could see vehicles before they got started, and drivers would have a chance to see people before they were fully turned. It is a big problem, and worthy of the best efforts of everyone, and only through discussions and publicity is it possible to bring about results that will satisfy everyone."

Fake Solicitor Re-Arrested

S. E. Summers, who was arrested by the Detroit police November 9 and sentenced to 30 days in the Detroit House of Correction, has been given another 30 days on another charge of obtaining money under false pretenses.

This is apparently the same individual who has represented himself to be an authorized subscription agent for Motor Age and who has used numerous aliases, such as C. A. Chase, C. A. Harper, A. B. Cutler, Frank G. Skeen, Frank Graham, and others.

His previous sentence expired December 9, but he was promptly rearrested on another charge of swindling preferred by one of his many victims.

Walter P. Chrysler the Man Behind the Buick Production

Walter P. Chrysler, president and general manager of Buick

By Allen Sinsheimer

YOU find the Buick Motor Co.'s factory at Flint, Mich. You see a series of structures that make more than 75 acres of floor space. You see them occupied by more than 10,000 workmen. You observe thousands of lathes, presses, ovens and other machines, as well as vast stacks of parts, raw castings, pipes, bolts and tools. Everywhere and always you find activity, and as you watch, it seems as if the million different parts leap into life, fit themselves to machines, attach themselves to chassis and suddenly evolve into Buick motor cars.

It is a factory filled with life, a vast mass of movement, steady, speedy and efficient. You are not surprised to hear that the Buick company makes 400 cars a day, that it plans to make 500 cars a day—you wonder only at the brain behind the factory, the mind that regulates the movement, the intellect that drives the overwhelming production with its harmonious, constant output of motor cars, which roll with clock-like precision into waiting freight cars to go to all parts of the globe.

Buick motor cars are familiar to you. Possibly you have owned one, driven one or ridden in one, but it is probable that you do not know the name of the man behind the Buick output—the man who makes Buick production possible — Walter P. Chrysler, president and general manager of the Buick Motor Co., and the most important factor in it.

You understand the importance of the carbureter in the motor car and know how the little instrument takes the gasoline, converts it into gas vapor energy, mixes it with air and produces the powerful mixture that propels the car. Mr. Chrysler is the carbureter plus the battery of the Buick plant. His remarkable genius for the supervision of men allows him to take labor, convert it into efficient energy, mix it with materials and machinery and ignite it into activity with his personal spark of intellectual power.

Walter P. Chrysler is a distinctly impressive man in his physical and facial appearance. One conversation with him leaves a lasting mental print of the man's personality to the interviewer. Probably the most noticeable traits are the unusal combination of simplicity, force and kindliness that stand forth prominently in his speech and appearance. He thinks with remarkable swiftness but talks deliberately, gives his opinions with a definite force and with a smile that denotes consideration. He is the president and general manager of a world-wide famous company, but you will find his office plainly furnished and its tenant simply dressed.

He Typifies Energy

He is a man of slightly more than average height, well built, with brown eyes, dark hair and a positive lower jaw. His eyes are undoubtedly the gage to the inner man. They display his kindliness, his determination and his intellect. When you look at Mr. Chrysler you are forced to think of work. He typifies energy, labor and activity as much as the statue at Ellis Island typifies liberty. If you saw him with a thousand others, all dressed in overalls, you would select him as the superintendent of the factory; if you found him in full dress at a club mingling with the other members, you would pick him as the organizer. In fact, if you sought to employ a machinist, a factory foreman, a railroad president or a mercantile salesman, it is most probable that you would choose him from the applicants, regardless of their numbers. He is one of those rare combinations—a 200 hp. motor that would fit equally well a limousine, a truck or a special speedster.

His actions are in full accord with his appearance. His office door is usually wide open. The word private does not appear on it. Any employee in the institution can gain admittance and a hearing. He always attempts to place himself in the position of the man in his employ and makes a careful effort to see all matters from the employee's point of view. He displays absolute faith in his men until they prove unworthy of it. He attributes his success to hard work and faithful service and his ability to anticipate future developments plus his method of handling his organization and says:

"I have always treated the men in my employ as I would like to be treated myself. By never endeavoring to maintain a one-man organization, by giving those under me the benefit of my experience and by promoting those who have made good through earnest efforts and loyalty, I have instilled the spirit of co-operation and harmony that exists in the Buick plant."

In these words he analyzed the secret of his success. The handling of men has been his supreme forte. His acquaintance among employees throughout the factory is remarkable. He calls many of them by name, and they frequently come to him with their troubles. Recently one workman came for advice for saving money. He had never been able to save, he stated, even though he made good wages, and he asked how to avoid the empty purse he found as each pay-day came. Mr. Chrysler outlined a system of saving for him which he has since followed. The man accumulated $500, paid it down for a home and has not only kept up the payments, but has $600 in the bank, despite the fact that it is only 15 months since he called and asked for Mr. Chrysler's advice. On many occasions he has put numerous important matters to a side and worked late at night to listen to workers and give them the attention their requests required.

He has a wonderful power of perception. He is able to analyze a report of operations with exceptional facility and unerringly places his finger on the cause of an unsatisfactory result.

He foresees a marvelous future for the motor car, pointing out the comparatively small number of motorists in the world at present, stating:

"The motor car industry will be very prosperous for the next 10 years at least to those who make a high standard of car equal to its purchase price. In fact, anyone who combines quality and efficiency at the present time in the manufacture of motor cars will find that there is no limit to the business they can do. "The motor car has revolutionized industry. It has stimulated social life. It has made the steel business as important as it is to-day, and it has taught all industrial life more economical and efficient methods of manufacture."

Native of Kansas

Mr. Chrysler was born in Ellis, Kan., and was graduated from the high school in that town. His industrial history is one of constant climbing, commencing as a machinist's apprentice, ending at the head of the Buick company. He began work with the Union Pacific railroad and in the course of his labors became employed at different times by the Santa Fe, Texas & Fort Worth and the Chicago & Great Western, each time making a move up the ladder, first

becoming a journeyman, then a machinist, a roundhouse foreman, general foreman, master mechanic and finally superintendent of motor power, in charge of all mechanical power for the Chicago & Great Western.

The first employment as a supervisor of men came to him as a result of a display of efficiency in his earliest railroad days. A passenger locomotive had entered the roundhouse with a broken piston and cylinder head. The engine was needed for immediate duty, and the master mechanic called for someone who could make the necessary repairs in the few hours available. Mr. Chrysler offered to do the work and qualified the engine for its duty within the specified time. Shortly afterward the superintendent said: "We did not believe it was possible to do that work within the short time allotted to it. You are working for a corporation that has standard rates of pay and it is impossible for me to raise your salary, but you may be assured that your effort has been appreciated and when the time comes you will be compensated."

Sixty days later, he received a promotion as a roundhouse foreman and for the first time had other men in his charge.

Buick Offer 5 Years Ago

After his employment as the superintendent of motor power, Mr. Chrysler became assistant manager of the American Locomotive Co., Pittsburgh, where after a short period he was made manager. Five years ago the Buick company offered him the position of works manager. He came to Flint, commenced his remarkable organization, instilled into the plant the efficient methods that have carried him to the top and in this last year became the president and general manager of the institution.

He does not allow himself to be carried far from his work. It has so become a part of him that play is regarded only as an exercise and a necessary diversion, and he gives as little time to golf and motoring, his major pastimes, as he is forced to, saying that he finds his chief pleasure in work, in the creation of successful business, and in his home. He is married and has two sons and two daughters, and his home life, like his industrial career, is simple, wholesome and genuine.

This is the man who is the power behind the Buick production, the man who regulates, supervises and controls an organization with an output of 400 cars a day. It is difficult to find words that truthfully portray him.

MARKING DIXIE HIGHWAY

Chattanooga, Tenn., Dec. 15—Members of the Chattanooga Automobile Club have completed the work of marking telegraph poles from this city to Knoxville on the Dixie Highway eastern branch and the Board of Commerce of Knoxville, through its highway committee, has planned to take up the work at that point, marking the road eastward on the Lee highway. Other links will be designated by organizations at Morristown, Greeneville, Jonesboro, Johnson City, Bristol, and on to through Virginia and Pennsylvania, to Chambersburg, where the Lincoln highway is joined. In this way, a clearly marked highway will be provided for motorists from the eastern part of the country and it is hoped that the work will be continued to Miami, Fla. The Chattanooga organization has marked the poles with 6-in. red and white stripes, while the Lee highway is to be indicated by two 6-in. green stripes with a 12-in. white stripe in the middle. The Lincoln highway markings will be red, white and blue. The Chattanooga plan was to mark three poles to each mile and two poles on each side of an intersection.

FORD LOSES POINT TO LEAGUE

Washington, D. C., Dec. 15—The District of Columbia supreme court today sustained three demurrers which the Navy League entered to Henry Ford's defense in the $100,000 libel suit the league has brought against him on the basis of advertisements published by Ford, attacking military preparedness. Ford pleaded in defense the publication was privileged because he believed it to be true. The league demurred to the plea as an issue to the tried in court and was sustained. The case will go to trial later on its merits. The advertisement stated the belief of Ford that the preparedness propaganda is spread by individuals and organizations with a selfish interest in the production of armament and munitions for the government.

GIRL HEADS STANDARD PARTS

Cleveland, Ohio, Dec. 18—Christian Girl has assumed the presidency of the new Standard Motor Parts Co., the new concern formed by the combination of the Standard Welding Co. and the Perfection Spring Co. The two plants will be operated about as before, but the perfection plant will be known as the spring department and the Stanweld plant as the rim and tube department.

Other officers of the new concern are: F. W. Prentiss, first vice-president E. W. Farr, second vice-president; T. E. Borton, treasurer. C. C. Bolton, and Arnold S. Goss, together with the officers above will constitute the board of directors. P. A. Connolly is secretary, but not a director.

DIXIE INCREASES CAPITAL

Louisville, Dec. 18—The Dixie Motor Car Co. has increased its capital stock from $150,000 to $400,000, divided into 4,000 shares of a par value of $100 and authorizing an indebtedness not to exceed $1,000,000. One-half of the stock is to be common and one-half preferred and the additional issue of 1,000 shares of common is to be held in the treasury of the company and issued to the present owners of common stock as it is subscribed for by them and paid for in cash.

Reaching Prominent Car Buyers

Studebaker Has Day Given to Selling Persons of Note

DETROIT, Dec. 15 — The Studebaker Corp. sold more than 6,000 prominent people in this country the latest model of Studebaker car on Monday, Dec. 4. On that day distributors, dealers and limited dealers were instructed by the company to call upon prominent persons in their districts, as designated by the company, and were informed that the dealer in each grade who sold a Studebaker car to the most prominent person in the United States, as judged by five dealers who were appointed by the company to act as judges, would receive a prize. The prize was a trip to the show in January in either Chicago or New York, as the winners might choose, with all expenses paid for a full week.

Since that Monday, the company has been deluged with orders, photographs, signed letters, telegrams and other means of communication with each dealer clamoring for recognition and a prize. The judges will without doubt have one of the most difficult tasks when they attempt to select the fortunate dealers. Five governors, nine senators and seven congressmen were purchasers of Studebaker cars on the prominent buyers' day, besides a host of other equally prominent people.

Among those who signed orders were Ex-Gov. Shellenberger of Nebraska, Mike Gibbons, champion middleweight pugilist of the world; Hugh Jennings, Walter Johnson, Hans Wagner, G. C. Alexander, Philander Knox, Frank Rockefeller, Charlotte Rankin, Elbert Hubbard, Jr., Josephus Daniels and Dr. Welch, the grape-juice king, a group that includes the famous politicians, business men, athletes and financiers.

The committee selected to judge the winners are J. P. Donovan, Boston, Studebaker dealer; A. R. Davis of the Studebaker Corp., Toledo; L. Markle of the Markle Co., Chicago; E. Weber of the Weber Motor Car Co., of St. Louis; O. H. Gray of the Gray Motor Car Co., of Minneapolis.

Douglas Bros., dealers who sold Dr. Welch his Studebaker, were on the ground early Tuesday morning at the Studebaker offices in Detroit, with photographs and a signed order to prove their rights to the prize for their division.

From the Woman's Viewpoint

How Christmas Finds Some Women

You can tell this garage is different when you see the curtains and notice the women tinkering with things mechanical. It is the Honorable Gabrielle Borthwick and her garage in Piccadilly

These shop girls from the London drapers have a motor fire brigade

KRIS KRINGLE was about ready to start out on his rounds of all the chimneys in the world when he thought he would take a look through the periscope that rose from his ice-bound home in the snow fields and see what he could see.

"My goodness gracious sake's alive!" he exclaimed when he did see what he could. "What strange work those women down in Great Britain and Europe are doing in the shops and on the streets. What is the world coming to next?"

But then he needn't have been so surprised as all that, for ever since the war began 2 years and more ago today's Christmas has been coming, and what is happening this Christmas is just the culmination of the last two Christmases. True, the last two Christmases weren't circumstances to what today's is, but if Kris Kringle had used his weather eye when he drove that brand new motor car down the snow slides from the north last year and the year before he would have had some idea of what he would find this time.

It is quite a change, though, to have women making motor cars and driving motor cars and making ammunition and running the motor ambulances that take the red cross to those whom other women's ammunition perhaps has hurt. And it is to be expected that Kris Kringle, being old-fashioned as he is, would not think such doings quite the doings for his feminine clientele.

Industry in Europe and the British islands is in a fever insofar as the munitions and motor car factories are concerned, at least. And it is the woman who helps sustain this fever, for the able-bodied man is led, driven or accompanied to the recruiting office and his place must be filled at home as well as on the firing line.

Women are everywhere. At the benches, at the machines, at the lathes and presses, at the wheel of the mail truck, the motor bus and the tram car, she has stepped out to show the world that she, too, is not a slacker. Machines which men operated prior to the war even turn out more under the hands of women, it is found. This is due partly to the speeding-up process con-

The women of France fill shells with shrapnel

temporary with war industry and partly to the tendency of the man laborer to keep the machine running at less than its maximum so that he will not be pushed too hard.

Lloyd George, England's new premier, has a woman for his chauffeur. It is one case in hundreds, no, even in thousands, for the woman of the war-engaged countries has proved herself not only capable of forgetting all the squeams and fears long placed to her credit, but has developed a mechanical turn that enables her to exercise the full duties of a chauffeur.

Berlin has the woman tram conductor, and the fares are rung up just as efficiently and the time schedule is adhered to just as rigidly as in the day when masculine conductorships were available.

Austria's Women Drive Cars

Austria-Hungary recognizes the woman as a factor of importance greater than before the war, when woman's work had the conservative estimate of the dual monarchy. After the war her importance is expected to be even more pronounced, and the modern basis of operation that is to come at that uncertain date is expected to see one woman, as well as one man, do the work of two or three men before the war. Now the women are seen more and more driving motor cars. Before the hostilities only the women of the richest classes drove cars, but the class distinction has been broken down here as elsewhere in the countries at war.

France employs the woman in the motor car factory, where her efficiency has kept up with and passed former records of production.

All the nations use women in the munitions factories. Women drivers test the trucks, ambulances and motor transports which come from the motor car factories that still build motor vehicles. Many of the motor car factories have been transformed into munitions factories, and in them both women and small girls do a large proportion of the work. Few of the factories, in fact, are building passenger cars. The motor car industry is restless, and the change to munitions has come about in many cases by the pessimism of some of the manufacturers who see nothing but bad business in the future.

In the munitions-motor car factory women make hand grenades and shells, encouraged to their greatest efforts by premiums in certain cases. The French factories—and no doubt those of the other countries also—have scores of contrivances to simplify operations and adapt existing machinery to special munition work, as well as systems to secure material and keep the car section running on a reduced scale while making bigger deliveries of war material than the army has estimated the factories could do.

Berlin has women tram conductors

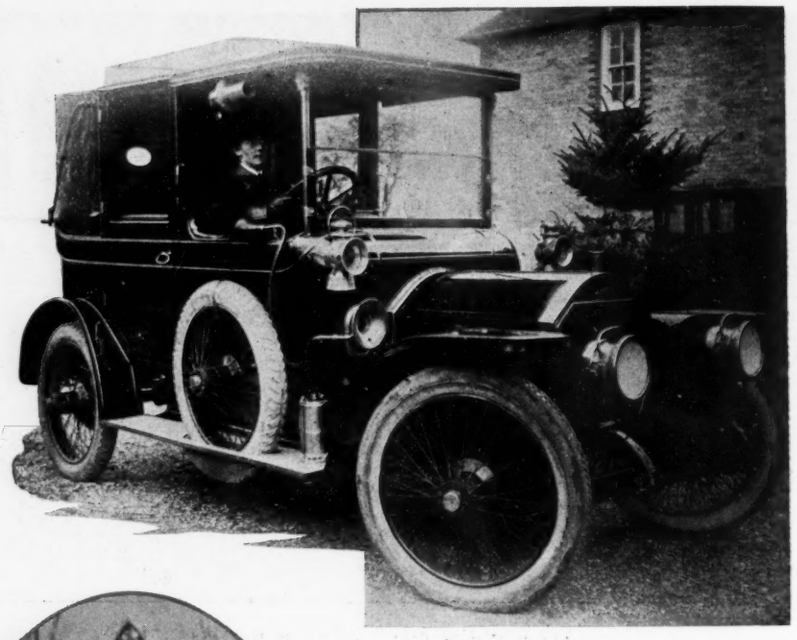
The output obtained with the work of the war countries' women is said to be at a maximum. Whether at a maximum or not, the statistics for the last few months have become stupendous. One factory employed 2,500 men and women, running two shifts and working 6½ days a week, producing 7,000 shells a day. The factory is modern, highly efficient and highly organized now, but not so long ago where it stands was an uncultivated, vacant field.

Another motor car company, in France, opened an English factory with 300 trained mechanics, built another for 1,000 workers, a third in southern France and doubled its original factory. Practically all motor car factories in the Midlands have been enlarged. Building goes on at night by the light of electricity.

All this increase has been made possible by the introduction of women to work hitherto considered completely outside their sphere. This Christmas they are indeed important factors in the motor car shops, and to them is given much of the credit for the speeding-up which has further increased the output.

It has been found simple to train a woman to get the maximum out of a machine, and the influence on the men has been one tending to raise the output of their machines. Canadian factories for quite a while have favored the woman employe in preference to the man, going so far sometimes as to refuse to employ any man able to take a place in the field.

The entrance of women into the various lines of manufacture has brought a certain prosperity with it also. Before the war only one member of a family worked probably. Now three of four can find employment. The minimum wage for the



Britain's women are especially active in the sphere of the motor car. Their former militant suffragism has been turned to good account, and the public knows the woman as mail truck driver, chauffeur, both private and public, and as mechanic. Above is Miss Alice Hilda Neville, who runs a successful garage. In the two pictures to the right is Premier Lloyd-George's private chauffeur, a Miss Marsh. Below a woman cranks a mail truck just outside the postoffice

girls is about $5 a week. Whether this activity of women in the motor car industry will continue after peace shall have come is another question. If the governments of the various countries should place bans on the import of motor cars for a certain period, say 2 years, it no doubt would continue. Other reasons why its continuance might be argued even in the face of no ban lie with the loss of men the war is causing.

The manufacturing phase is not the only one in which woman has found a new importance. As chauffeur her ability was shown long ago. As garage and repair man—rather inconsistent—her influence is broadening. Famous Piccadilly well knows the woman as a repairer. One example is that of the Honorable Gabrielle Borthwick who has a workshop within its sacred confines. She is a qualified engineer and has a large staff of girls who have learned to understand motor, gas and other engines, electric light mechanics and so on. The girls and the Honorable Gabrielle Borthwick are by no means unable to diagnose and cure sick motor engines. It is their business not to be unable, and they are not the least lacking in business ability.

The shop girls of a London firm, for all Kris Kringle can tell, may be putting out a fire on the day of his visit. They have organized a motor first aid corps and fire brigade to take the places made vacant by the men who have gone to the front, and putting out fires is a mere detail in their work.

Not Flowers but Workers

The woman of the European and English Christmas of to-day is more than the fair creation of charm and the delicacy of the lilies that bloom in the field. You do not think of her as the dwelling place of capabilities, dependences, unreason and keen common sense. She is a worker. She even debates with others of her sisterhood as to whether conscription of women for work should or should not be put into effect.

From passiveness the women of the war-engaged countries have entered activities that make them solid walls behind the fighters. They are marshaled by the hun-

This is London's first licensed woman bus conductor

dreds and thousands, and they do what they can, whether they must leave their supposed class to do it or not. The woman who in times of peace aided her husband by being political socially or managed an estate or a club or broke her passiveness to be a militant suffragist may now organize an aid corps or a canteen or motor transport corps or a farming squad.

Munitions Draw Most Women

Or she may be in the munitions factory, the strongest magnet for women workers. Or she may do her part in a hospital, where she is apt to be set to scrubbing floors side by side with the natural-born scrubwoman who puts to shame her feeble efforts. For class distinctions are breaking down, and she can do any one of a number of things without fear of consequences.

There is no need to leave it to be inferred that all these women work for patriotism and attendant emotions. Hundreds of thousands of women are working because they need the money. The wage earner of old is the same in that one respect, but there is an added variety to the work the wage earner can do. The teacher, for instance, has become a munitions worker, as have the stenographer and the domestic servant, as well as a few rich, idle women who are trying to make use of unaccustomed hands.

The woman who has a soldier husband works partly because the allowance she may get from her government does not equal the income to which she grew accustomed during peace and partly because she, too, wishes to take the place of some absent worker. The woman who used to work in the ordinary factory, that turned out merchandise, patent foods and so on, has changed to the munitions and motor vehicle factory for the increased pay that she gets and for the added sense of helping.

The workers find long hours, and the humanitarians who advocate the 8-hour law to save wear and tear of its women could hardly approve. The heavy work, the constant strain, the confusion, the exhaustion—there is plenty of opportunity to practice endurance such as the soldier in the trench knows. They accept all this physical demand on them in a fatalistic manner. "What is, is."

Boring shells for France

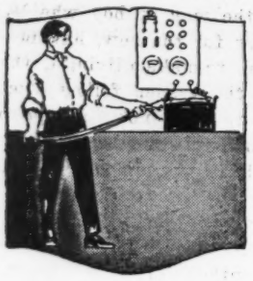
Meantime, the men are being killed, and the necessity of filling their places at home with women is becoming more apparent. In England—as an example—before the war there were 1,000,000 more women than men. What would the difference be now? This was said to be a conservative estimate. The same is true of many of the countries involved. For one reason, often it is the man or boy who leaves the old country for the new, having found it impossible to make a living in the old. Sometimes the women follow afterward; more often they do not. At the beginning of November the number of deaths among the casualties was computed to be 462,500,000. This was the total for the toll exacted among the fighting men of all the belligerent nations. The war had been going on 26 months then.

The monthly average comes to more than 711,000 killed, wounded, prisoners and missing. If the war is to remain a contest of attrition, it probably will continue to take human toll at this rate for another 2 years at least before the gaps for one side cease to be filled. The casualties, the total of which is four times the number of deaths, is allotted as follows: 10,000,000 to France, Russia, Great Britain and Italy; 8,000,000 to Germany and Austria; and the remaining 500,000 to the smaller nations—Belgium, Serbia, Montenegro and Roumania on one side and Bulgaria and Turkey on the other.

New Sphere Seems Assured

The effect on industry after the war, therefore, seems likely to be similar to that existing as a contemporary effect of the waging of the war. And woman's place in the vacancy brought by the recruiting bids high to prove permanent. So Kris Kringle may as well get used to the sight now as later.

Preparing shells for boring



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the twenty-fifth installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently. It is expected that the book will be published about May 1.

WHAT HAS GONE BEFORE

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems and the relations of current pressure and resistance brought out. This was followed by an explanation of series and multiple circuits, and how electricity is made to do work in lighting, starting, signaling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was taken up and the best methods of connections. A separate section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and best methods of charging them. Magnets and electro-magnetism then were considered and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. A consideration of electromagnetic regulation followed. A section was given to electric motors.

Part XXV—Operation of Two-Part Commutator

IF a single loop of wire be mounted on an axis which is at right angles to the direction of a magnetic field, Fig. 161, and a current be supplied to the coil by means of a two-part commutator and two brushes which rest on the commutator exactly opposite each other, a force will act on the sides and ends of the coil. The direction of the force acting on any part of the coil may be determined for all the different positions the coil may occupy when it turns on the axis supporting it by a simple application of the left-hand, or motor, rule. Remember that the force acting on the conductor is always perpendicular to the direction of the magnetic field; then proceed to investigate the force acting on the coil for various positions. The resultant force which tends to produce rotation acting on the two ends of the coil will be zero for all positions of the coil. The forces acting on the two sides of the coil will be equal in value for all positions, but the directions of the forces on the two sides will be exactly opposite each other. If the force on one side tends to move that side of the coil up, then the force on the other side tends to move that side down. The force acting on one side will always be up and the force on the other side will always be down, and both will remain constant in value as long as there is no change in the strength of the magnetic field or in the value of the current.

These forces on opposite sides of the coil, being in opposite directions, tend to rotate the coil, but the tendency for rotation is not constant in value for all positions of the coil. When the coil is in a horizontal position, as shown by the cross-section in Fig. 162, the effect of the forces in tending to produce rotation is at a maximum, because the two sides are then moving, as the coil rotates, perpendicular to the direction of the magnetic field. But for any other position of the coil with respect to the direction of the magnetic field, such as the one in Fig. 163, the effect of the forces tending to produce rotation will be less, and this effect will continue to decrease as the coil moves from a position parallel to the field toward a position perpendicular to the field, as in Fig. 164, where the force producing rotation will be zero. The relation of the forces tending to rotate the coil for different positions of one complete revolution may be represented by a curve, Fig. 165, in which points along the horizontal lines correspond to different positions of the coil as measured in degrees from a position perpendicular to the direction of the magnetic field. The relation of the lengths of the vertical lines corresponds to the relation between the values of the forces tending to produce rotation for the different positions.

When the coil becomes perpendicular to the magnetic field the two commutator segments exchange positions with respect to the brushes, and as a result the current in the coil reverses

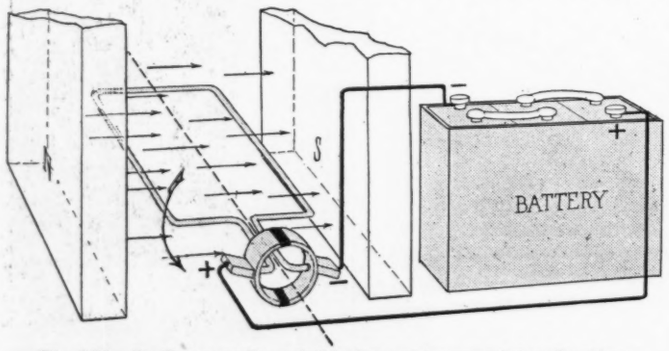


Fig. 161—In the operation of this two-part commutator the direction of the force acting on any part of the coil can be determined by application of the left-hand rule

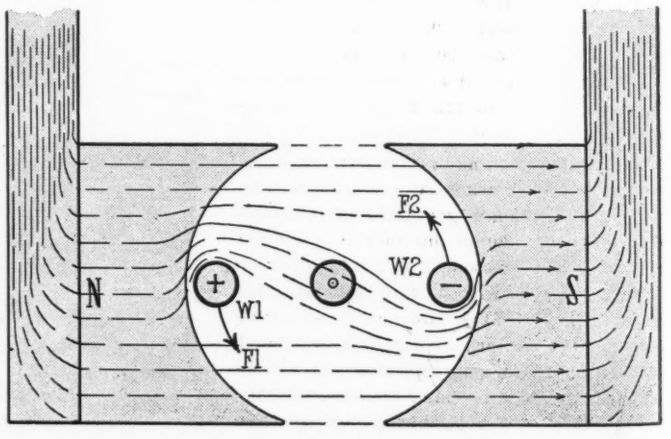


Fig. 162—When the coil is in a horizontal position, as shown by this cross-section, the effect of the forces tending to produce rotation is at a maximum

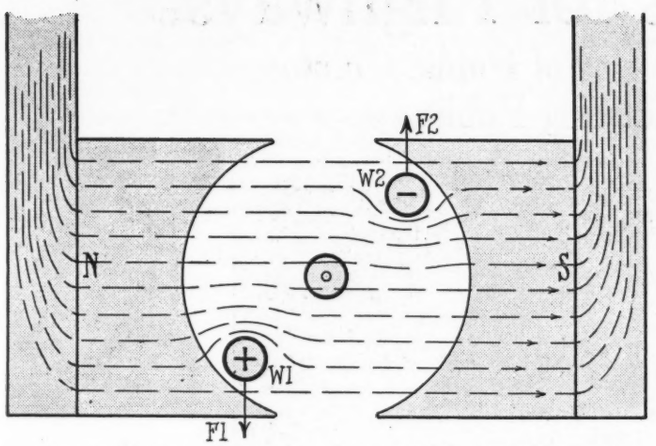


Fig. 163—When the coil is at an angle of 45 degrees, as here, the effect of the forces is less and will be for any position other than horizontal

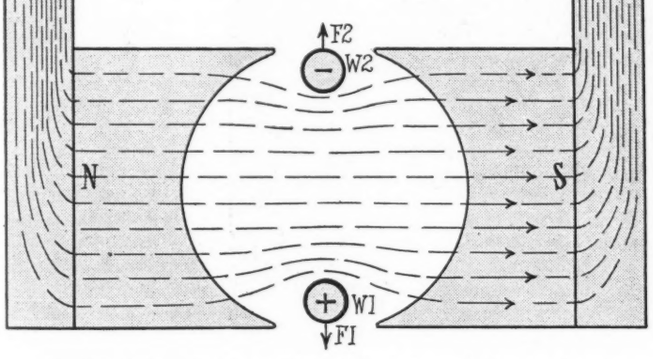


Fig. 164—When the plane of the coil is perpendicular to that of the magnetic field, as here, the force producing rotation is zero

in direction. With a reversal in the direction of current in the coil, there is a reversal in the direction of the forces acting on the two sides, so that they tend to move across the magnetic field in directions opposite to those before the current in the coil was reversed.

It is obvious from the preceding paragraphs that the force acting on the coil tends to produce a continuous rotation, provided the magnetic field does not change in direction and that the brushes are properly placed on the commutator. The value of this force, however, fluctuates in value. When the coil is perpendicular to the direction of the magnetic field it is zero, and if the coil should happen to stop in this position, there would be no tendency for rotation no matter how much current in the coil or how strong the magnetic field. Such an arrangement would not be at all satisfactory, on account of the fluctuation in the turning force on the coil and also because this force is zero for two positions of the coil in each revolution. The turning force may be made nearer constant in value and at no time zero by more coils and more commutator segments.

If two coils of wire, similar to the one described in the previous section, be mounted on an axis at right angles to each other, with the four terminals connected to a four-part commutator, the terminals of each coil being connected to opposite segments, Fig. 166, then the force tending to turn the two coils will pulsate in value as follows: Since the two coils are at right angles to each other, the forces acting on them will likewise be at right angles to each other. If the currents in the two coils are equal in value when they are connected, assuming they remain

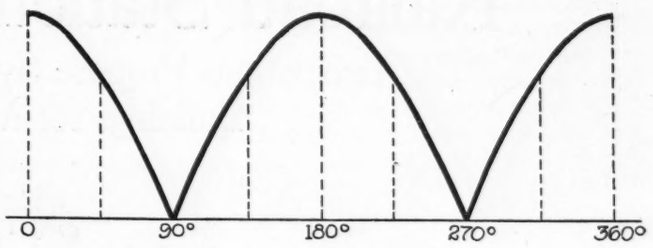


Fig. 165—This curve shows the variation in the force tending to rotate a coil connected to a two-part commutator when it is placed in a uniform magnetic field. The angles are measured at a position when the plane of the coil is parallel to the magnetic field

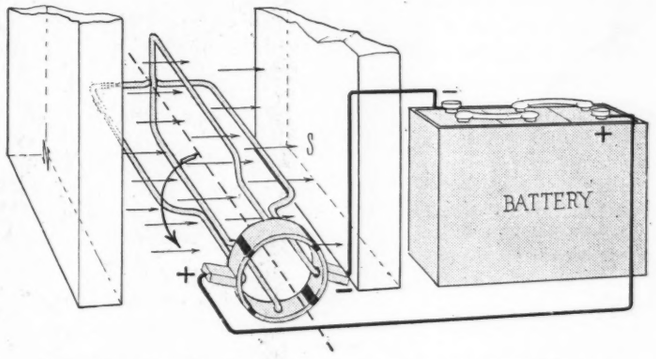


Fig. 166—When the terminals of two coils are connected to opposite segments of a four-part commutator, both coils do not carry current at the same time

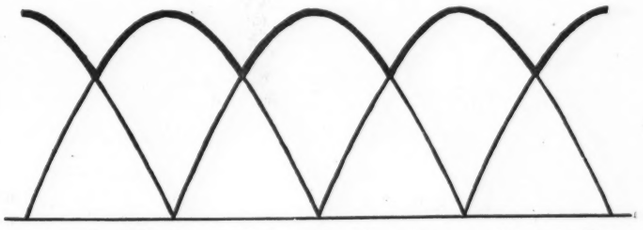


Fig. 167—The forces acting on the two coils connected as in Fig. 166 may be represented by these curves. The magnetic field is assumed to be uniform

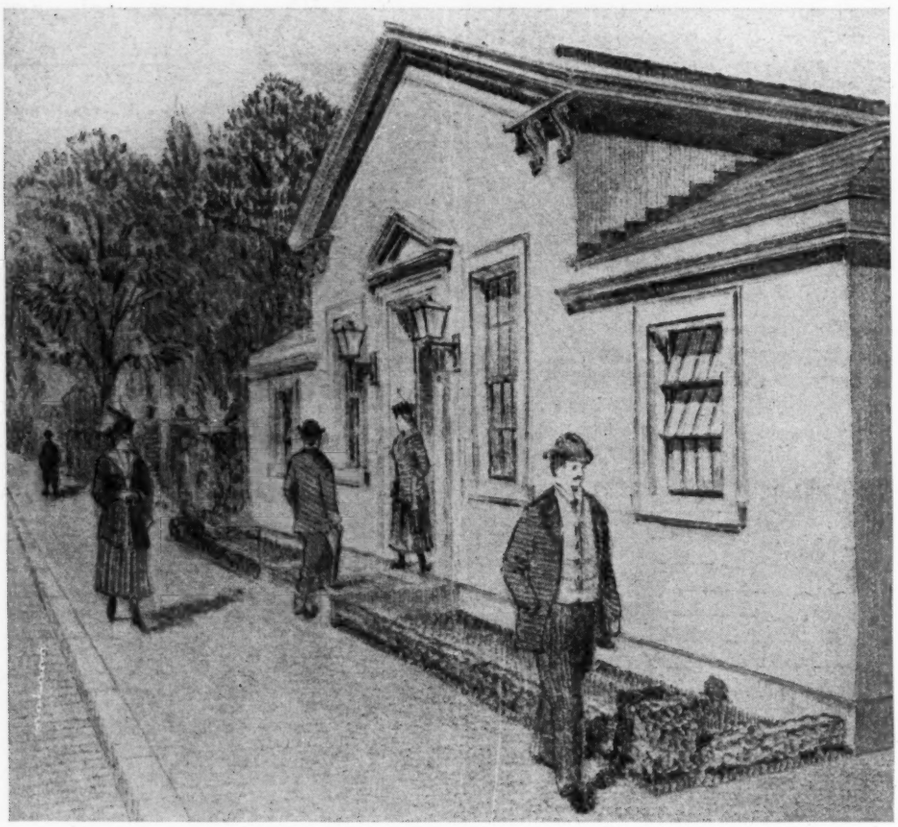
so for one complete revolution, then the forces acting on the two coils may be represented by two curves, as in Fig. 167. Both coils do not carry current at the same time, since they are connected to independent commutator segments and the brushes rest on segments exactly opposite each other. Each coil is connected in circuit for each revolution only one-half of the time, but this time is split into two parts and each independent connection lasts only for one-fourth of a revolution. By properly placing the brushes it is possible to get a continuous turning force acting on the combination of coils, and the best position for the brushes is such that one coil is disconnected and the other one connected to the external circuit when they are making the same angle with the direction of the magnetic field, namely, 45 degrees. This position of the brushes corresponds to the point where the curves cross each other, Fig. 167, and the resultant force acting on the two coils may be represented by the upper parts of the curves, or the shaded portion.

By increasing the number of coils and commutator segments the force acting on the coils will become nearer constant in value. This type of armature is not satisfactory for direct-current motors, as only those coils whose commutator segments are under the brushes at any particular time are in use. An armature winding of this type is called an open-circuit winding.

This phase of the series on Electrical Equipment of the Motor Car will be concluded next week.

Railroad Stations for Highways

Associations Propose Systems of Public Comfort Buildings for Motoring Public



This is the exterior of the model public comfort station designed by a New York architect, Ernest Flagg

"THE American Plan" purposes to build a public comfort station at every point in the United States where a public comfort station is needed. It is fostored by the American Automobile Association, the National Old Trails Road Association and the National Highways Association, who propose a system of roadside stations along the highways similar to passenger stations along the railway tracks.

Government Will Aid Plan

The importance of the plan to build these stations is recognized by the Government. The Department of War has assigned an officer to co-operate with the Public Comfort Station Bureau, and the Departments of the Interior and Agriculture have been interested in the project.

The argument advanced in favor of the plan cites the contrast between train travel and motor travel. If you go from New York to San Francisco by train, at the station you find a warm waiting room, with a stand where papers, periodicals, candy, tobacco, etc., can be purchased. There are telephone booths, drinking water and toilet accommodations. When you board the train the same conveniences are present. If you start on the same journey by motor car at no points along the highway are stations. Yet, more persons travel by motor now than by train.

Under the "American Plan" every town through which a main highway runs would have one or more public comfort stations, provided with the conveniences of railroad stations. In the western part of the country, where towns are far apart, the county or township would erect these buildings along the lines of travel, perhaps incorporating them in community buildings with auditoriums or libraries.

The plan was conceived by an American who visited Europe and noticed the thorough provisions European countries made for the public in the way of public comfort stations. The "American Plan" would have stations heated in winter, provided with hot and cold water and all necessary conveniences. No money will be collected to build them, however. The national organizations intend to work locally with commercial and civic bodies to influence the city governments to appropriate money for the stations in their limits.

A building such as is recommended would cost $6,000 or $8,000, depending on local cost of materials. A typical roadside station has been designed by Ernest Flagg, a New York architect, and embodies the ideas of the bureau. Pay departments make it possible to have self-supporting stations, in some cases profit-paying as well. This method of making stations self-supporting has been tried. The Lackawanna Railroad Co. has free toilet accommodations and pay compartments in its terminal station in Hoboken, N. Y., and the income from the pay compartments more than meets the expenses of all compartments combined.

Proposed Features of Stations

To make the public comfort station serve its purpose there should be city directories, road maps, charts and guide books for free consultation by the traveling public, so that information about the city streets, hotels, theaters, libraries, schools and other points of interest may be obtained. Attendants should be at the stations, also, and apartments could be provided on the second floor for them.

Following the lead of the railroad stations, a large waiting room should be provided for men and women. In the waiting room could be pay telephone booths, vend-

ing machines, weighing machines, newspaper and periodical booth and public checking stands. Hot and cold water and soap might be free, while the pay compartments would include comb, brush and towel. The idea as set forward by the bureau furthering the plan is that, since such a station should be provided for the traveling public, it should be made a real convenience station in as many ways as possible, so that it will serve every ordinary need and pay for itself at the same time.

Though the original thought of the proposed system of buildings is to aid motor travel, aviation is not ignored, and it is urged in the plan that enough ground accompany the building to give room for landing, parking and starting of aeroplanes. Since Congress has appropriated money to buy 150 aeroplanes for the navy and more are proposed for the army, it would be well to provide for them at these stations, but the main object is to help systematize and improve the highways and to make travel by motor more pleasant and more comfortable.

How to Get Stations

To obtain a public comfort station in your locality, you are advised by the bureau to call a meeting of the chairmen of the local branches of national associations interested in the project and the officers of local civic and industrial bodies and women's clubs. The mayor and councilmen also should be interested, and some one from the engineering and health departments appointed to co-operate with you. A committee appointed by the mayor, perhaps, would plan a system of public comfort stations, though only one might be built at first. Manufacturers of motor cars or parts in your locality will probably co-operate, as nobody is to be more benefited by these stations than the motor car industry.

When the plan has been adopted and money appropriated, you can help take it to neighboring communities along the road as you are motoring. As to the cost: It is estimated that $10,000 is more than enough to build and start a public comfort station. This is but a loan, however. The city builds the station and owns it, and the receipts from the pay privileges not only equal the cost of operation, but inside of 10 years the cost of construction. In small towns the stations may be built for much less, but with the same conveniences; these likewise can be made self-supporting. If, after the buildings are erected, they are kept clean, the plan will be permanent in its success.

TOLL GATE BECOMES NUISANCE

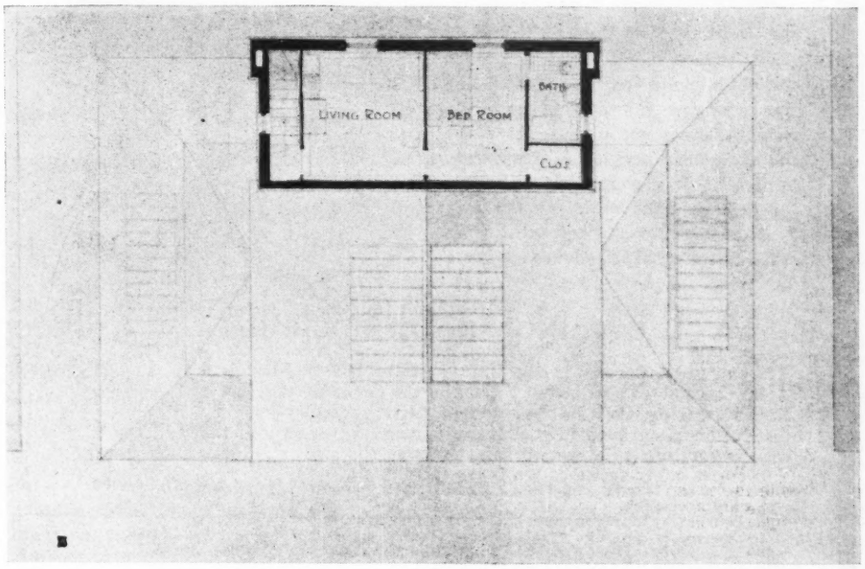
Trenton, N. J., Dec. 15—As the Lincoln highway leaves Trenton it crosses a bridge on Calhoun street, and no matter how many motor cars may be passing that way, all must stop to pay toll. For the bridge is the only inter-state toll gate on the highway in the East, and situated as it is, in the direct path of travel to and from the big football games at Princeton, its power to hold traffic at a standstill is too well known.

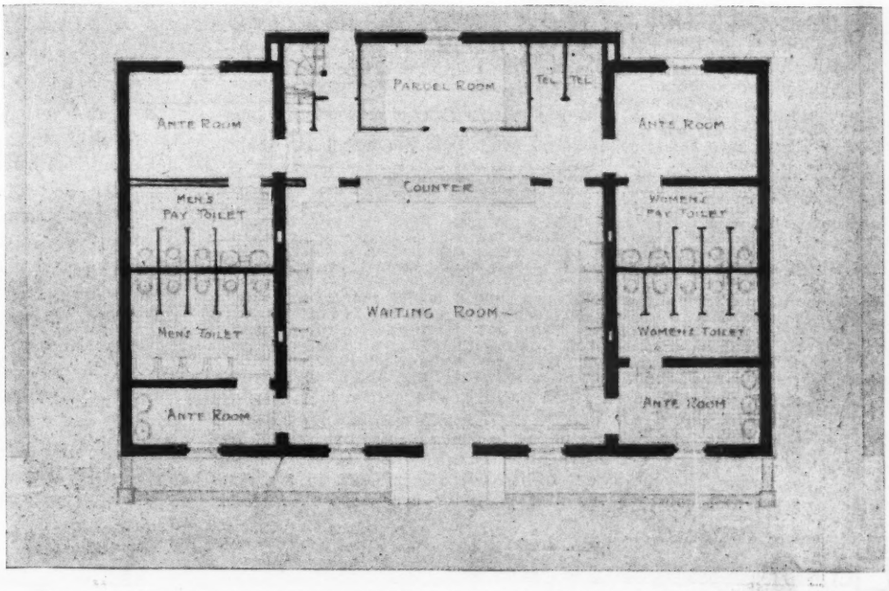
Trenton wants to get rid of the toll bridge, however. Local demand for its free use is increasing with the growth of travel on Lincoln highway, and the New Jersey and Pennsylvania highway commissions are expected to take up the matter. Sometimes street car service is temparily tied up while the stream of motor cars returning from a game pass through the red tape of the toll bridge. Ordinary traffic is growing heavier, too, and it is the general opinion that the toll bridge must go sooner or later.

TO CURB CAR THIEVES

Philadelphia, Pa., Dec. 16—A concerted effort has been made to curb the increasing number of car thefts in this city. During the last year, it is estimated, about $1,000,000 worth of cars have been stolen. At a recent conference between Director Wilson of the Philadelphia department of public safety and members of motor clubs it was decided to establish a new division in the department, to be known as the motor car division.

This division is to be composed of 300 selected owners of cars who will be sworn in as special policemen. They will be men who are on the streets constantly. Various methods for preventing the thefts were discussed, including putting the manufacturer's number on the car in a conspicuous way, so that its absence would invite suspicion; having the owner's photograph attached to the car; parking cars without chauffeurs in certain specified places; crossing spark plugs; disconnecting the ground wire from the magneto and locking the engine hood.





Here are shown the first and second floor plans of the comfort station. The second floor is for the carekeepers, who are to be in constant attendance

New Semaphore Safety Signal

OPERATING along the lines of the Safety First movement recently inaugurated in New Orleans by Commissioner of Public Safety Harold Newman, the commission council has caused to be installed a new safety device in the congested retail businss district along Canal street, making it safer for pedestrians and traffic. The new device is a semaphore signal operated by policemen stationed at each corner of the thirteen blocks of Canal street from the Terminal station to the river. The new signal replaces the rather unsightly umbrella-topped wooden affair formerly in use and besides which the traffic policemen stood and regulated by whistle the ebb and flow of the city's street life.

The new device, which is really an improvement upon the one in use in New York and other large cities, is made entirely of steel and iron, except the canvas umbrella which serves not only to give the police officer protection from rain and heat of the sun but is a part of the signal as well.

Standing upon a circular base foundation that is covered with a rubber mat, the device consists of a steel pole surmounted with cross-arms of red and green, at the ends of which, in white bull's eyes, are the words "Stop" and "Go" in letters large enough to be seen entirely across the street and farther. Surmounting the cross-arms are bull's eye lanterns similarly arranged, with red and green lights for use at night.

New semaphore used in New Orleans, La.

The device is operated for changing signals by a hand lever in easy reach of the officer's hand, which is so constructed that it locks the signal at the proper point automatically, so that no mistake in giving the signal can occur.

Around the base of the device and extending as high as the officer's knees is a canvass protection from the weather.

The umbrella above is also quartered in red and green and turns with the cross-arms showing the same color signals. The hand lever works on ball bearings which is a distinct improvement in these devices. This with the locking device was a suggestion of Commissioner Newman.

A Law; Not a Shibboleth

IN one great factory in the United States Safety First is a law and not a shibboleth. That is the plant of the Hyatt Roller Bearing Co., Newark, N. J. Every employe in the institution is enrolled in a Safety First organization and the code is familiar to every worker. It is as follows:

The best safety device known is the safety man.
To be a safety man you must go to the sickroom, even if it be only a scratch.
To be a safety man you must boost for safety first.
To be a safety man don't violate safety rules.
To be a safety man you must be a careful man.
To be a safety man you must not forget.
To be a safety man you must not be a practical joker. He is always a source of danger.
Don't wait until you are hurt before you become a safety man.
To be a safety man report all dangerous places to the Safety Inspector.
Don't put your hands into dangerous places. If you get caught and your hand cut off, remember it is off forever.
Don't clean your machine until the stated time, or when your machine is stopped.
Don't get near a revolving shaft with rags or waste hanging out of your pockets.
To be a safety man always think that you may be the only support of your family.
Be a safety man by minding your own business.
Be a safety man by wearing goggles when you dry grind or chip steel or iron.
To be a safety man don't wear poor soles or heels on your shoes. Poor heels make you slip and you never know when you may step on a nail or sharp piece of steel.
To be a safety man each person should be his own safety inspector.
To be a safety man never mount a ladder that is not safe. Send it to the carpenter shop, where it will be repaired.
To be a safety man don't stop your machine with the palm of your hand on the belt. The wire lacing will get you some day and there will be blood poisoning or lockjaw.

A first aid room that is as efficiently equipped as a hospital, and a first aid corps which comprises seventeen members, are parts of the Hyatt Safety First organization. Workmen in the Hyatt factories are urged to consult some one of the first aid corps for every hurt—even though it may be but a slight scratch. The equipment of the corps is modern in every respect and contains the first pulmotor ever used in Newark.

Keeping to the Right

A CONTRIBUTOR to the Appleton Post, of Appleton, Wis., makes the following interesting suggestion to motorists desiring to avoid trouble when they arrive at crossings:

There is one catchword that if remembered will make driving simple and a pleasure, which it is not now at crossings. That word is "Right," which means—to the right of everything at crossings—where there is a traffic officer, he controls traffic, of course. Confining ourselves to street crossings, the motor car must hit nothing coming from the right, but slow down and proceed back of or to the right of a vehicle coming from the right side of the thoroughfare.

So watch out to the right, at street crossings and go to the right of anything coming from that direction. You are not compelled by law to look to the left, as the driver coming from that direction must if necessary to avoid collision, give way or stop until you are out of his way. It is impossible at times to look both ways, so every driver should know that at crossings he must give way for everything coming from a right hand street. If he does this he will avoid accident in many instances.

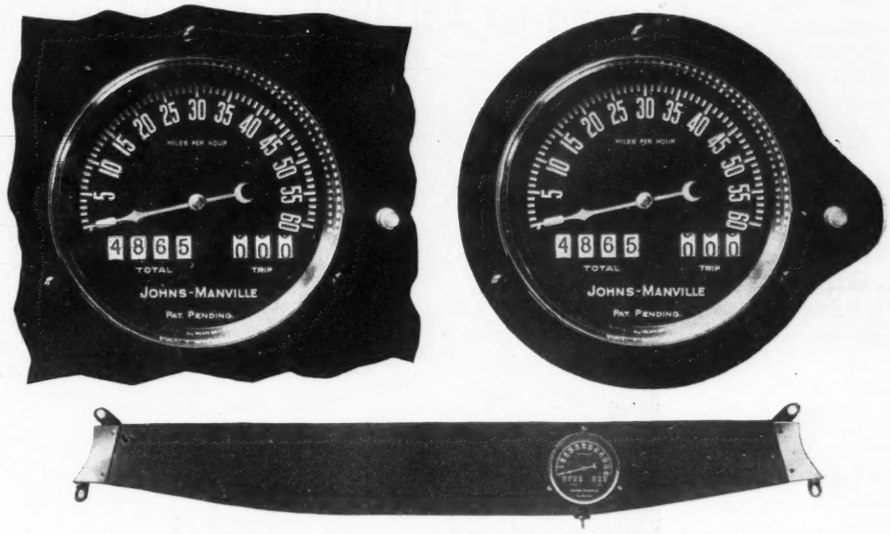
This is a long description of right of way but it is needed to drive out many former ideas we had on the subject. Of course, it is the practice of all good drivers to slow down at every crossing and look up every cross street and all drivers must learn to do that sooner or later as the law provides that they must. It simply is a question of care such as all drivers should respect.

Speedometers for Every Application

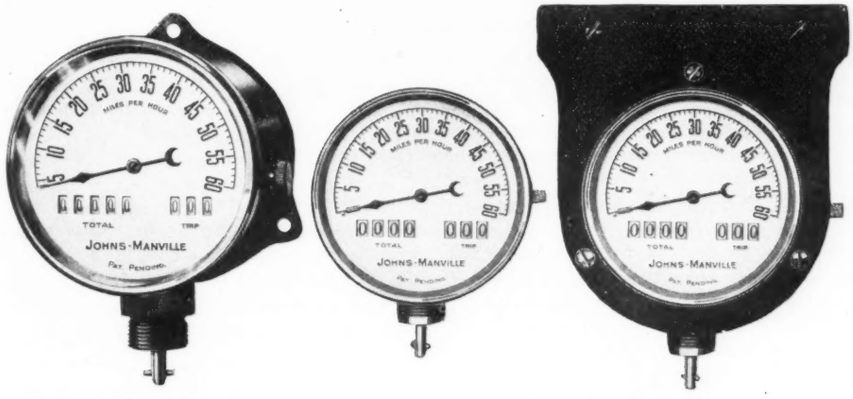
New Johns-Manville Offering Includes Complete Line of Instruments

THERE are now six models in the line of speedometers manufactured by the H. W. Johns-Manville Co., New York, five of which are new. The line includes a combination instrument board, and speedometer for use on 1916 and 1917 cars, an instrument for Fords with flush mounting in a suspension plate which attaches to the windshield, a special model for Dodge cars which is to be standard equipment on the 1917 cars of that make, a standard model for flush mounting to the instrument board, and another for bracket mounting, which is applicable to all makes of cars except Fords.

The bracket mounting instrument for Ford cars is continued without change. All models have 3¼ in. dials, 60-mile speed scale, and a 10,000-mile season odometer register. The standardization of the dial size is new as is the adoption of the 10,000-mile register instead of the 100,000-mile register previously used. The trip odometer reset mechanism which necessitated the use of two hands for operating has been replaced by mechanism composed of a knurled shaft which projects through the flush ring and engages a set of gears with the trip reset mechanism. The new Johns-Manville instruments are furnished in black and nickel.



The model 113-H Johns-Manville speedometer, which is standard equipment for 1917 Dodge cars, and the 101-H type for dash mounting to other standard makes. At the bottom is the new speedometer and instrument board model 3009 for use on Fords



The model 3000 Johns-Manville instrument for Fords, a continuation of last year's model 3001-D; the 101-AA instrument and the model 3006 with plate for attachment to the windshield strip of Ford cars

The Dodge instrument, which is model 113-H, is mounted flush with the dash and is held in place by three oval-headed machine screws which turn into nuts brazed to the three steel supporting clips which are spot-welded to the instrument case. The model 101-H is similar except that it has a special flush ring to make it suitable for flush mounting on practically any instrument board. As in the models previously described the reset projects through the dash to the right of the speedometer dial. The model 101-H lists at $25, including front wheel fittings.

The 101-AA differs from the former in that it has either a rigid or adjustable type of dash bracket for mounting. In this instrument the trip reset projects at the side of the case. The price with fittings is $25.

Any of the instruments described may be fitted specially for drive from the gearbox or universal.

A new Ford model is in combination with an instrument board. This assembly, known as model 3009, has a maple board finished in dull black.

There are adjustable end brackets to provide for possible variation in the width of the Ford body. The instrument board is so made that clocks, starter switches, dashlights, etc., may be flush mounted on it if desired. The trip reset on this model is from the back of the instrument board. Price, complete, $11.25.

Another new Ford model is the suspension plate type with the same instrument as used in the model 3009 except that this instrument is set flush in a dull black metal plate which is designed for attachment to the windshield strip where it may be easily read. The price complete with all fittings is $11.

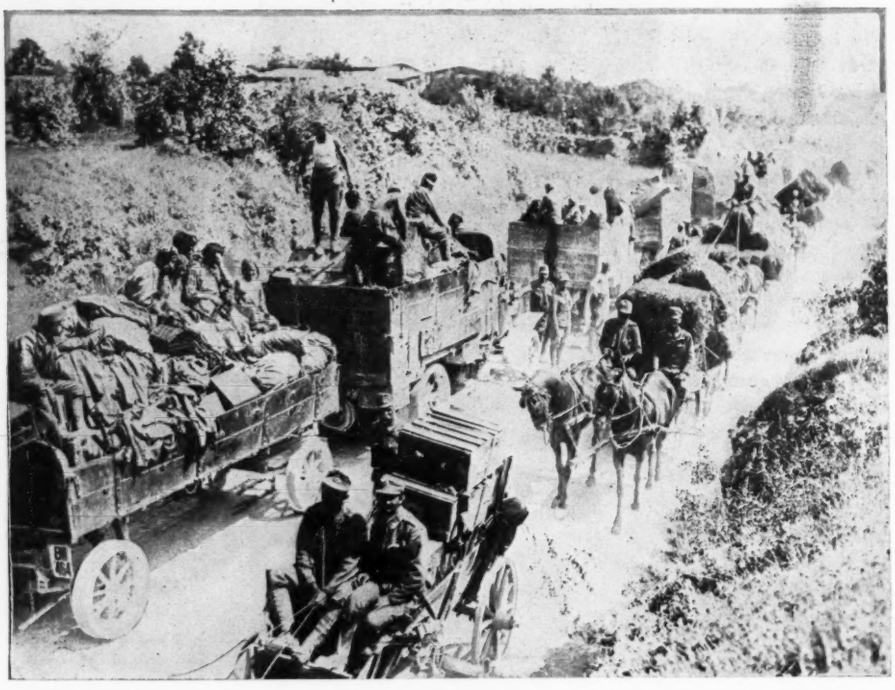
The model 3000 for use on Ford cars is a continuation of last year's model 3001-D with a dash bracket riveted to the back of the case. This instrument continues the use of the $100,000-mile season odometer. The instrument combines black and brass and has a white dial with black figures. It differs from other models also in that it uses a knurled wheel trip reset instead of the knurled shaft. Price, $10.

The Jones hub odometer will be continued by this company under the name, Johns-Manville hub odometer. Its special field is in commercial car use. It has a 100,000-mile odometer register. This instrument is furnished so that it may be readily substituted for the ordinary hub cap found on the axle. The list price of the larger model is $20 and the special Ford size is $15.

Tachometers are being made in four models to show revolutions per minute of the engine shaft from 50 to 4,000. These instruments are centrifugally operated, in fact they are practically the same construction as the speedometer, except, of course, the calibration is different. The instruments list at $30 for the 3¼-in. size and $40 for the 4-inch size.

Effect of War on Austrian Market

Education to Use of Modern Appliances Promises Demand for 150,000 Cars in First 2 Years of Peace



With the Austrian army on the Italian front. This motor transport train is on its way to the firing line when it passes the refugees who are being conveyed to the rear

By Edward Allen Langdon

THE beginning of the war found Austria with perhaps 40,000 motor cars, a small number for a nation of almost 60,000,000. Austria-Hungary was primarily an agricultural country, and in Europe this means a country none too progressive. Hence, modern machinery, both in manufacture and transportation, was introduced slowly. The horse played a very important role in the transportation of passengers and merchandise. The agricultural population, except the rich landowners, were partly not in a position to buy motor cars and partly still mistrusted this modern type of vehicle. The peasant of this country is much more conservative than the American farmer, or for that matter, the farming classes of England and France. Hence, the rural sections were almost without motor vehicles, except where lumber mills and other large industrial undertakings utilized motor trucks.

War to Bring Modern Basis

But these conditions have changed. The supply of horses has decreased greatly. The peasant class has suffered more than any other class in the war. Agriculture will be put on a more modern basis, so that the work formerly done by two, three or four men can be done by one man or a woman, as women are now a factor as never before in the life of Austria-Hungary.

The population has been educated in a broad way to modern appliances by the war. Soldiers from the farm, who never had opportunity to handle mechanical devices, have become interested and adept in driving motor cars. The industries of Austria began to take to motor cars even before the war, and this trend was enhanced by the policy of the government to subsidize purchasers of motor trucks made in Austria, provided the trucks filled certain governmental specifications for use in war. This policy doubtless will be continued with increased energy when peace has been restored.

Hungary Offers Field for Cars

Special attention should be given to Hungary. This part of the dual monarchy has increased very much in importance during the war and is today more powerful than its official title, "the Kingdoms and Countries Represented in Parliament," would signify. Hungary is primarily an agricultural country, fertile enough to feed all Central Europe, given proper methods of distribution. The country also is rich in mineral resources, and the last two decades have seen rapid growth of industry. The war is bound to accelerate this development, and as Hungary has been enriched very much in all classes by the war, it ought to offer splendid opportunities to enterprising exporters of American cars.

The field for motor cars includes the very types sought and bought by American farmers of the West and Middle West, as well as three-wheeled tractors suitable for connection to agricultural machines.

Women have become so important in the social and economic life of Austria-Hungary that they also will have bearing on the growth of the motor car industry. Cars in many cases will be operated by women, though before the war none but women of the richest classes operated machines. It follows that, women being perhaps less ready to grasp mechanical details, the bulk of motor cars sold in Austria-Hungary will have to be fairly simple and yet reliable in construction.

Climbing Ability for Cars

Austria is to a very large extent mountainous, and passenger cars for touring purposes will have to possess good climbing ability, plenty of reserve power and fair fuel economy. The Austrian fuel after the war will be benzine, which is practically the same as American gasoline. Touring cars should be comfortable, strong and efficient, without being too heavy. Buyers will look for machines built along lines somewhat similar to those of the Austrian Daimler, though lighter, fitted if possible with large tires, as well as electric start-

ing and lighting and all the necessary accessories and fixtures required for the particular class of touring.

A service station, capable of supplying any reserve parts needed within a few days, situated somewhere in Europe, is an essential in selling cars in Austria-Hungary. Another is the knowledge of the native language by the salesman and, of course, discretion and politeness, perhaps, even diplomacy; many in Central Europe are now anything but enthusiastic admirers of America.

At this writing the line of transit between Hamburg and Bagdad is practically unbroken; and unless the fates of war change fundamentally in the future, Vienna will be the central point of the important bridge between industrial Germany and the progressing Near East. Austria-Hungary is bound, in such an evolution, to play an important role, and preparations are being made financially and technically to fit her for playing it.

Cars Would Need Guarantee

It is estimated that more than 150,000 motor vehicles will be demanded during the 24 months following the war. From talks with members of the Austrian industries, I should put the demand at 150,000 passenger cars at $700, 5,000 trucks at $2,000, and 1,000 trucks at $3,000, a total of $118,000,000. The prices marked would have to be f. o. b. New York, and wherever agencies are given to local dealers transactions would have to be done on letters of credit for 4 months' sight draft. Motor cars would have to be guaranteed substantially also.

As to selling cars in Austria-Hungary a few points have been mentioned already. The most advantageous method of utilizing the territory would be a central place in Vienna and four or five branch salesrooms in Austria and one or two in Hungary. Perhaps the best plan would be for several makers to combine for the export of their products to Austria-Hungary in order to reduce the expense and use the saving for selling the machines at the best possible prices.

It is very difficult to lay down definite data regarding the cost of such agencies, but a place in Vienna and moderate advertising can be had for from $12,000 to $15,000 a year. This makes possible a turnover of from $60,000 to $80,000 for the same period.

A half dozen or so well-known, medium-priced American cars were introduced in Austria-Hungary very successfully before the war, and while the supply of these cars was cut short by the outbreak of the war many of the machines have given splendid service in the army and have served to create an excellent reputation for American cars, regarding which many persons felt rather chary prior to the present calamity.

There has been a tariff on motor cars, and it will be continued probably after the war, perhaps even increased. If this is the case export to Austria-Hungary of motor car parts will pay even better than that of complete motor cars. The country offers a good market for tires, and while some Austrian and German makes are on the market, American products, if properly handled, should be able to completely replace them. Likewise, accessories such as starters, speedometers and so on are certain to find a good market in the dual monarchy after the war.

Preparation Now Is Advised

At any rate, preparations for handling the Austro-Hungarian after-war business cannot be made too early. Not only is this so because doing business in this country of many tongues and nations requires deft treatment, but also because Germany is certain to recover with great speed from the war. The German Empire, due to the preparations made, even now, for the days of peace, while supreme efforts are being made still for waging the war, will be beyond a doubt the first country of Europe to get over the effects of the war and will do everything in its power to obtain a maximum share of the world's trade.

Logically Germany will begin with the places nearest home: Austria-Hungary, Scandinavia, Poland, Italy and the Near East. Export to all these territories is, therefore, really one great question and will have to be handled as such. Unless American manufacturers realize this in time, they will lose the greatest chance of the after-war period; just as—according to many economists there—they have done themselves out of a good share of lasting international trade by devoting their energies chiefly to the destructive and very temporary business of supplying the European war.

The Motorists' Bookman

The Spell of Islands

In this day of the ukulele a book on the islands wherein dwell the originators of the vogue is particularly apt. The Spell of the Hawaiian Islands and the Philippines, by Isabel Anderson, author of other of the Spell series published by the Page Co., not only tells of the land of the ukulele, where the new has not yet supplanted the old, but takes up the customs and so on of the much-mooted Philippine possessions. The historical and political conditions of both are considered, and descriptions of the islands give us idea of the charm to be found there. In connection with this presentation of charm, it is pleasing to note that one of the most prominent features of American influence involves the development of road systems and, hence, accessibility to the charm.

The Page Co., Boston; 373 pages, illustrations and maps; $2.50 net.

Texas—The Marvellous

The state of the six flags comes in for its share of exploitation as a place to visit when one of the See America First Series books is given over to its monologue. France, Spain, Mexico, the Republic of Texas, the United States and the Confederate States of America—each, in turn, raised aloft its flag. That one lone state should be the bone of contention so often is explainable partly, at least, by position and size.

The author, Nevin O. Winter, writes of the Spanish settlement and the Indian missions; the coming of La Salle; early romance of pioneering; the 9-year republic; the Alamo; the Galveston rehabilitation; the timber; the irrigation and other of those phases of the development of "the Marvellous State."

The Page Co., Boston; 342 pages, illustrations; $3.50.

White Good Roads Trucks

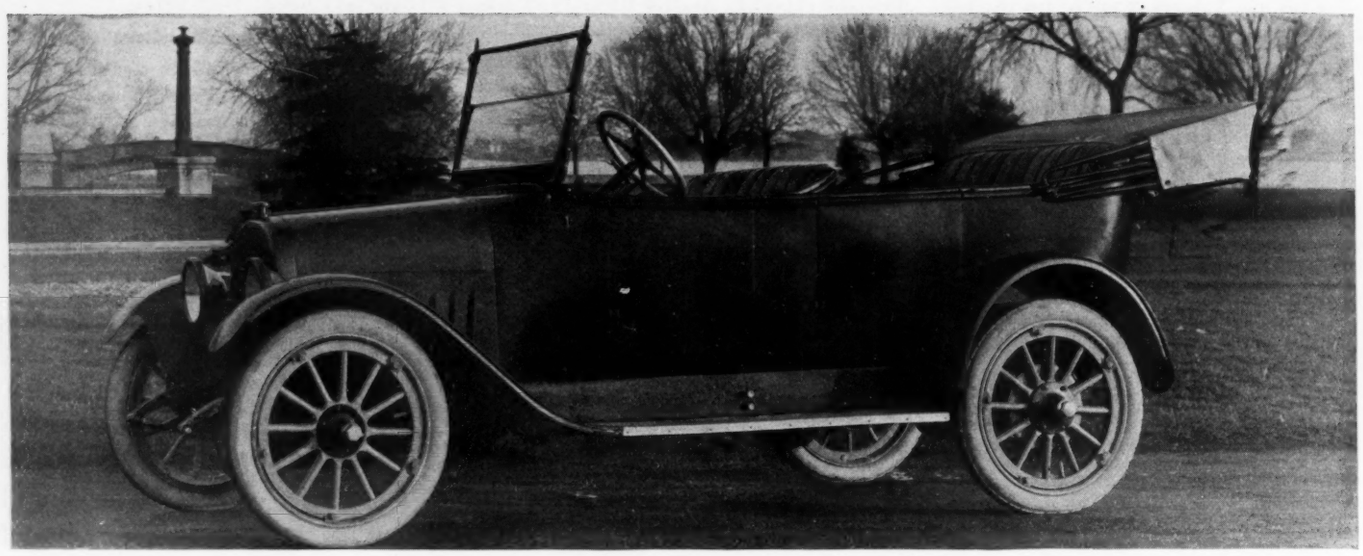
The White Co. makes a special good roads truck for the use of highway builders, and it is of this truck and its work that a recent publication, White Good Roads Trucks, treats. Photographs and specific examples of use show reason for the advantage of the good roads truck over mules or horses. Forest county, Miss., for instance, saved $2,800 a mile by the use of trucks when the county undertook to continue a road built by a contractor at $3,000 a mile. The road commissioner of Washington county, Miss., reports a saving of $11.50 daily. A truck displaces 32 miles in another county. And so on.

Good Roads Machinery Department, White Co., Cleveland, Ohio; 56 pages.

Blackfeet Tales

The Blackfeet were once the lords of what is now the Glacier National Park, and it is of those days of much medicine that the tales are told. The author, James Willard Schultz, has been as much a part of the Blackfeet tribe as it is possible for a white man to be. He was adopted by them when he was a young man, married an Indian and for a long time lived and hunted as they did. It is on his revisit to the encampments in the national park that he takes down these legends, which are to help make more nearly complete the incomplete records of the aboriginal American.

The author draws on his own experiences and adventures to make more graphic the tales that tell, among other things, of the sacredness of the number four and the pity that the names bestowed on the mountain peaks have been carelessly superseded by modern and meaningless names. The illustrations alone would make the book worth while. The tales of a passing people emphasize that worth. Blackfeet Tales of Glacier National Park is published by Houghton, Mifflin Co., Boston—$2 net.



Harroun Has Valve-in-Head Four

Long-Stroke Motor, Wide Rear Seats, Bosch Magneto and Oil Radiator

THE finished motor car product of Ray Harroun, which bears his name, will make its first public appearance at the motor shows. A general description surrounding the whole car is that it is a roomy, five-passenger job on a 106-in. wheelbase. The motor is valve-in-the-head four-cylinder with a long stroke with relation the the bore.

Features which give the car individuality for its price class both mechanically and in appearance are: unusually wide rear seat, 49 in. inside the upholstery; low-hung body, Bosch magneto and radiator cooling of the oil.

Regarding the hanging of the body the running boards are but slightly higher than the lowest part of the car, which is the front axle. The step from the running board to the body is unusually short. This low hanging is very largely due to the use of long cantilevers in the rear.

The dimensions of the motor are interesting. The bore is 3¼ and the stroke 5¼-in., giving a large piston displacement, comparatively, for the amount of horsepower under N. A. C. C. rating.

As previously stated, valves are in the head which is detachable. Actuation is by rocker arms from a camshaft in the conventional position, but the valves are placed at an angle, allowing the spark plugs to enter at the same angle on the opposite side, thus placing the ignition spark in the center of the firing chamber.

The combustion space is machined out throughout its surface to minimize carbonization and possibly the lagging of gases due to rough surfaces. Cooling is thermo-syphon with a honeycomb radiator.

The system of lubrication has been given especial attention and embodies some unique features. The oil is continually

Showing cast-in exhaust stove and mounting of Bosch magneto on Harround $595 car

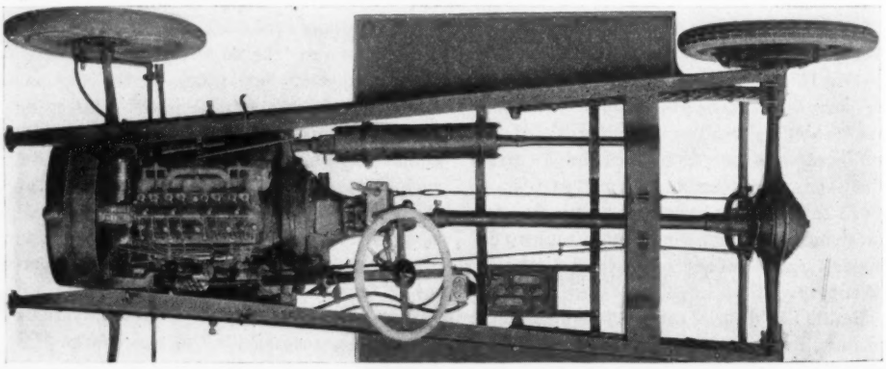
circulated through a radiator which maintains it at a low temperature, thus greatly lengthening the life of its lubricating qualities. Oil is fed in direct leads to each of the three main crankshaft bearings.

In a car of this price it is a rather striking announcement to include the Bosch magneto in the list of specifications. This has been adopted in conjunction with Remy starting and lighting to complete the electrical equipment. The generator is driven from the front end of the camshaft and the starter meshes with teeth in the flywheel through a Bendix pinion assembly.

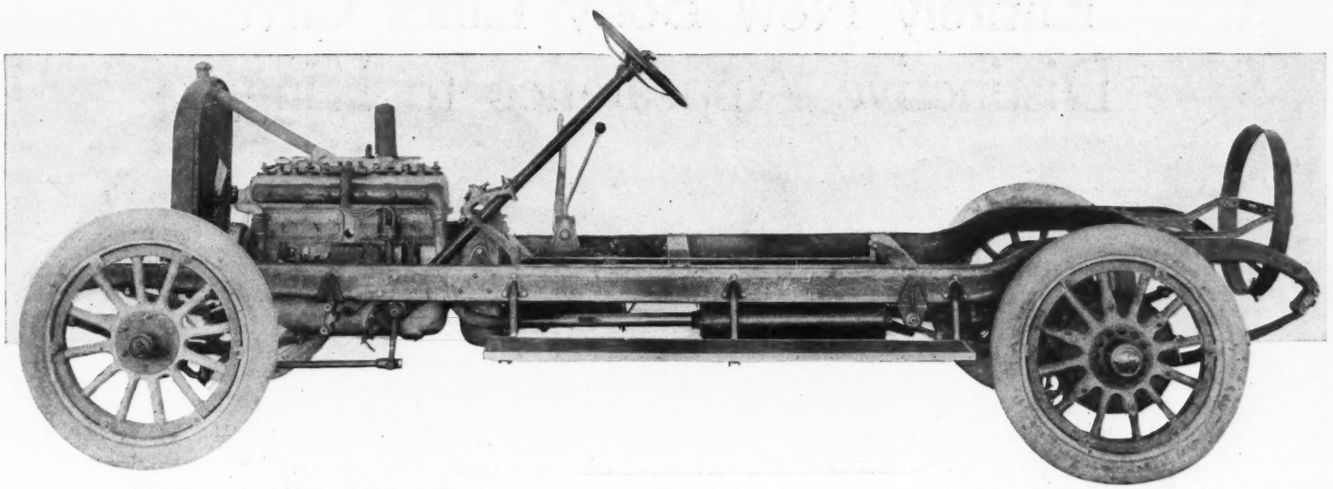
Drive is conducted from the motor to a conventional three-speed gearset through a steel-cone clutch with an asbestos fabric for facing. This clutch runs in an oil bath. The rear axle is floating, shafts being removable through the wheel hubs.

The steering wheel is unusual in its mounting. It is placed on a spider of laminated-steel strips, each of which is arranged as a flat spring. This construction is designed to absorb road shocks which would otherwise be conducted to the driver's wrists.

The frame is flared in a pronounced way, opening at the rear to an extent of about 14 in. from the measurement at the front. This permits the very wide rear seat previously mentioned. The gasoline tank is located in the cowl.



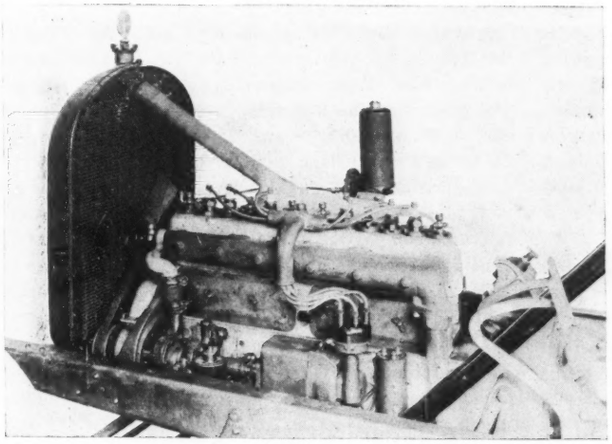
The abrupt flare of the Harroun permits rear seats 49 in. wide inside upholstery



Chassis of Louis Chevrolet's new American six, showing low hung frame. The appearance of sturdiness strikes one's eye

American Six Design of L. Chevrolet

Heavy Frame and Carefully Designed Load-Carrying Parts Make Sturdy Car



The motor of the American six is designed with a view of minimizing all possible weight, yet maintaining maximum strength

Comfort and Nicety of Detail Sought for in Design of This $1285 Job

THE American six, made by the American Motors Corp., Plainfield, N. J., is a new car of moderate price and strong distinctiveness produced under the aegis of Louis Chevrolet. Louis as a motorist of very many years standing is well able to appreciate the many little things that go to providing the ultimate owner of a car with real contentment; he knows just what gives annoyance when neglected and the car itself is proof of the extreme practicalness of its engineer.

The price of $1285 is sufficient to enable great care to be given to detail in addition to providing the best of main chassis units, it permits the body to be nicely furnished, well upholstered and thoroughly comfortable; most of all, it allows the engineers to make their own designs wherever they feel that they cannot purchase a stock article as good as they could make it.

As an example, the engine is specially designed for the car, though the gearset and the axles are stock products. The frame is one of the strongest and most rigid of any car in its class and all the brackets, spring hangers, etc., are secured with particular care. It is a car which ought never to rattle or squeak and should be almost as good after a year's hard use as when it was first turned out of the factory. Weight has been studied also, and it is stated that the finished car is very light for its power.

The engine has the popular dimensions of 3 by 5 in., and is an L-head type without a detachable head, there being large valve caps, those over each exhaust valve having a substantial priming cock. As an example of detail it is noteworthy that the cylinder which carries the pressure connection for the Carter fuel feed has a tee fitted in the valve cap so that the advantage of a cock is not lost even on one cylinder. The accessories such as the Gray & Davis generator, ignition unit and starter, are grouped around the cylinders with due regard for their accessibility, the Zenith carbureter bolts right against the cylinders, the gland of the water pump and the fan belt adjustment are all within easy reach after lifting the hood.

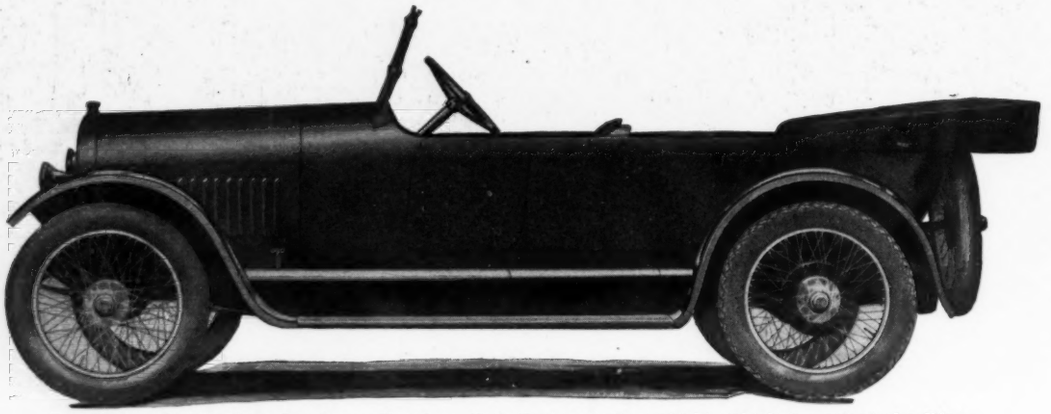
Regarding the water pump, this delivers to the front end of the cylinders, and one of the clever ways in which weight has been saved is here apparent. Saving weight is largely a matter of making one part do the work of two, so the water pipe which conducts the cooling fluid from the pump to the cylinders is a casting which also serves to carry the fan spindle, as can be seen in the illustration.

The cylinders are all one casting, but this does not include any part of the crankcase, the latter being all of aluminum, for lightness sake. Platforms of aluminum carry the electrical units, the Gray & Davis timer being combined with the generator and the coil unit set alongside it. The starting motor is also on a platform where it is well out of the water and dirt which would reach it in a lower position. It should be noticed that the electrical accessories are so mounted that they do not interfere with the accessibility of the valve tappets, which are easily got at by removing pressed steel covers.

Lubrication is on a rarely used system, but a very good one, as the cams and tappets are a prime consideration. Nothing contributes more to a noisy engine than wear of the valve operating parts, so the American six has the camshaft inclosed in a tunnel and the oil is pumped to this in such quantities that the lower ends of the tappets are dipping in the lubricant. Thence it overflows into splash troughs beneath the connecting rod lower ends, and these splash it up into deep gutters on the

(Continued on page 41)

Entirely New Body Lines Give Distinctive Appearance to King



The King radiator shape has been altered so that it represents a shield, which is part of the King trade-mark, and the hood line is carried straight back to the windshield, from which the sides sweep down and back to the cowl at the rear of the front seat

A NEW series of King eights, which is to make its bow to the motor buying public at the New York show, is distinguished by body lines and comfort refinements that should make the different styles more than ordinarily interesting. The new body lines are most noticeable on the seven-passenger touring car and the new Foursome. This change commences with the radiator, whose shape has been altered so that it represents a shield, which is part of the King trademark and the hood line is carried straight back to the windshield, from which the side lines sweep down and back to the cowl at the rear of the front seat.

The chassis is identical with that employed at present, except that a Stewart vacuum fuel feed is used. Evidently the A. A. A. stock car tests which have been a feature of the King Motor Car Co.'s development program during the last year have satisfied its engineers with the performance of the present construction.

The Foursome mentioned above is a new four-passenger design. This, like the seven-passenger and three-passenger is priced at $1,585, an increase of $185 over the figure which has been in force since November 15. The seven-passenger open sedan, seating two more than previously, sells for $2,150.

The new King four-passenger model, designated as the Foursome, has long, low, rakish lines, sporty type. The windshield is tilted nad while wire wheels will probably predominate on this type they can only be secured at extra cost. In the driver's compartment are two comfortable individual bucket seats 19 in. wide and 19 in. long. The tonneau seat measures 42 in. wide and 19 in. long and is built strictly for two passengers.

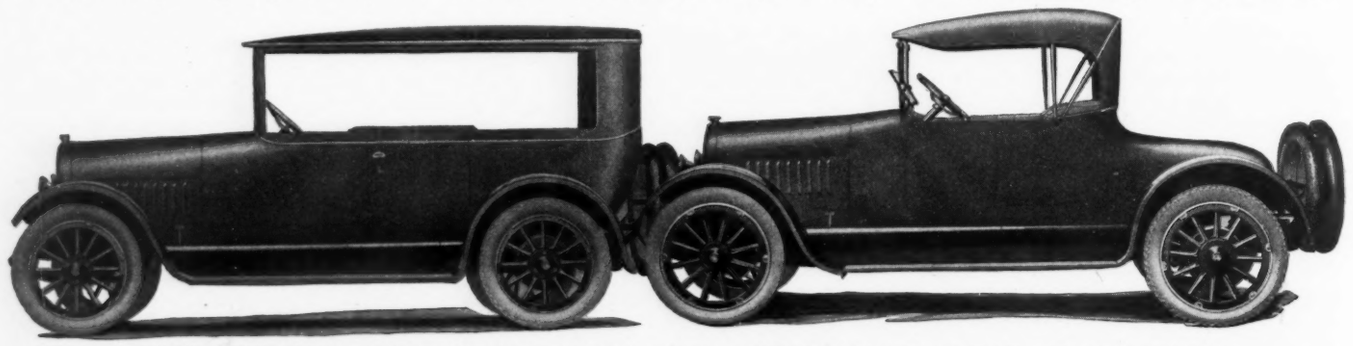
Much Attention to Finish

Much attention has been given to finish, refinements, little conveniences and other details so essential to please the critical. On the seven-passenger touring car, a special drawer has been arranged under the front seat for carrying tools. In the tonneau the cowl board is of Circassian walnut finish. In the center is a tonneau light, which is also a combination trouble lamp. The cord is self-winding and of sufficient length that the light can be carried to any part of the car. There is also a small compartment under the tonneau cowl board where small articles can be carried.

In the four-passenger Foursome and the three-passenger roadster a special carrying compartment for small luggage, sport equipment, etc., etc., has been arranged. This is unusually large and can be gotten into without leaving the car or disturbing the passengers. It is also provided with a lock. Instead of carrying the spare tires on the roadster in the deck as done in the former model the tires are swung on a carrier which extends from the rear of the frame. The space where the tires were formerly carried is now used as an extra carrying compartment. The deck is hinged, provided with locks and swings upwards.

A paint scheme of phaeton green for the seven-passenger touring car, French grey for the roadster, Oxford Lake for the Foursome will be carried out on these models while the sedan will be supplied in either a deep maroon, beaver brown or suburban blue.

To recapitulate briefly the features of the chassis, the motor is a V-type eight with a bore and stroke of 3 by 5 in., fitted with Atwater Kent ignition and Champion, Toledo-made spark plugs. A Ball & Ball carbureter, with two mixing chambers, is fed from a Stewart vacuum tank. Ward-Leonard starting and lighting equipment is used in conjunction with a Williard 6-80 battery. The tire equipment is either Good-



At the left is the seven-passenger eight-cylinder King sedan, model EE, which sells for $2,150. *The three-passenger roadster illustrated at the right sells for* $1,585

rich or Firestone, 34 by 4 on all models with non-skid rears.

Wire wheels are optional on any of the King body designs at an extra price of $100. The rear axle is floating and the same type of 48-in. rear cantilever spring suspension is employed with semi-elliptic spring suspension in front.

Cooling is by the thermo-syphon system with Fedders radiator. The drive is through double Spicer universals. The wheelbase of the chassis is 120 in.

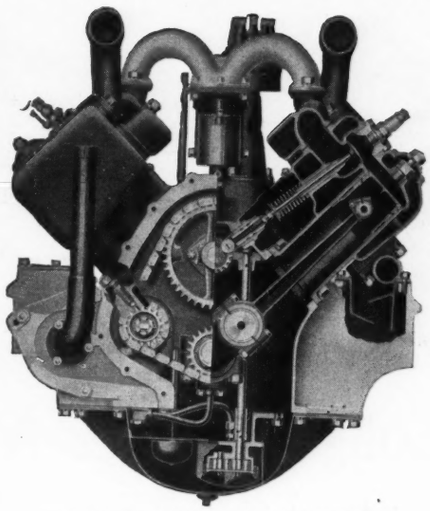
American Six Design of L. Chevrolet

(Concluded from page 39)

crankcase webs that conduct a copious supply to the main bearings. There are three of the latter, and the shaft is 1¾ in. in diameter; large enough to guard against vibration even at high speeds. There is a big oil filler cap accessibly located on the side of the crankcase, and alongside it is a wire attached to a float which shows the oil level in the crankcase pump, so that the level can be read while pouring in the oil, a thing which is not by any means true of all motor cars.

The Borg & Beck dry disk clutch is used and this has multiplying levers incorporated within it, so that a very light pedal pressure is enough to release; at a guess the pressure is between 30 and 40 pounds only and any woman could operate the clutch without the least difficulty. The accelerator pedal also has an easy action, and the gearshift lever is brought to a position within a natural grasping reach, so that changing from one gear to another is about as easy as it could be. The brake lever is placed far enough from the gear lever to prevent any possibility of a mistake, but near enough to be within equally easy reach.

Geared to $4\frac{5}{12}$ to 1 on high the American six is able to tackle most road conditions on high, but the facile gearshift is a great advantage when an exceptional grade is encountered. There are, of course, three



Cross-sectional view of model EE eight-cylinder King motor, showing oil-pump location

speeds, and the gearset itself is very compact, being as light as possibly consistent with ample strength. Back of the gearset there is a tubular propeller shaft with two universals carrying the drive to the Sailsbury rear axle, upon which the brake equalizers are mounted, this again eliminating an assembly which would otherwise have to go upon the frame as a separate part. From the hand brake lever a single, straight rod goes right to the back axle without any other frame attachments; from the brake pedal there is a rod to a swinging lever depending from a cross member, and then another rod to the axle, the reason for using the lever hung from the frame being to give the brake a smoother action, as Hotchkiss drive requires the brake rod to be pivoted at the proper place.

The rear springs are semi-elliptic, of ample length and width to give easy riding, and they are underhung, passing beneath the rear axle. For steering, ease of action has been obtained in two ways. First, the front axle is set on the springs at an angle, providing a natural castering action which is just enough to give a "feel" to the wheel and, second, the steering gear itself, a Lavigne, is well provided with anti-friction bearings which make it free from stiffness. It is adjustable for wear also, so that backlash can be removed should it develop.

Having a 122-in. wheelbase, there is plenty of room for the five-passenger body, which is the standard type and the only one that will be made at present. It is upholstered in leather and finished in dark blue. There is a good deal of polished woodwork, notably on the cowl board and back of the center cowl. Upholstery material and stuffing have not been skimped, with the result that very comfortable seating is provided.

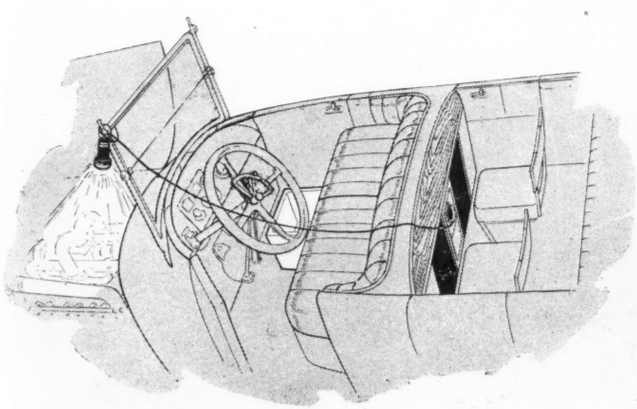
On the cowl board all the instruments have been grouped together in a single assembly, the speedometer, ammeter, etc., all being in one unit. In connection with this there appears one of the little details that typify the car. It is well known that on most cars the position of the fuses which protect the battery is somewhat obscure. The American six has one main fuse protecting all circuits, the lamps, the ignition and the horn, and this fuse sets in little clips above the speedometer dial on the cowl board plate. This means that should it blow a new one can be slipped in instantly, without anything to undo. Also the fuse makes a safety switch, since the driver can pull it out and put it in his pocket on leaving the car, and then no electricity can be drawn from the battery for any purpose.

Equipment generally includes 32 by 4-in. tires, a spare rim, mounted on a particularly stiff rear carrier, and all the usual accessories.

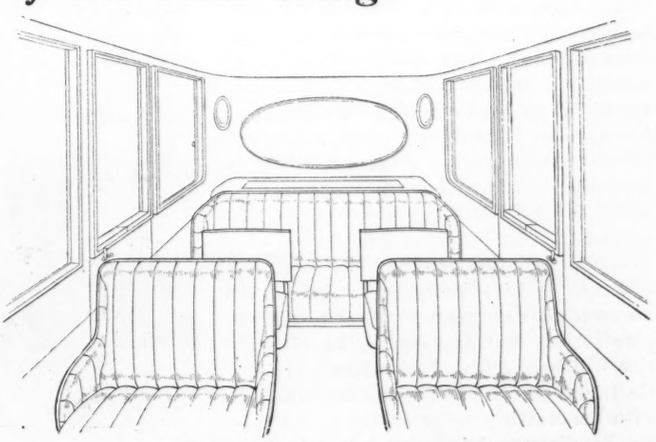
K. C. SPEEDWAY HAS FIRE

Kansas City, Mo., Dec. 16—The grandstand, erected at a cost of $12,000, at the Dodson speedway near Kansas City, has been destroyed by fire. The structure was 800 feet long, all of lumber, and burned rapidly.

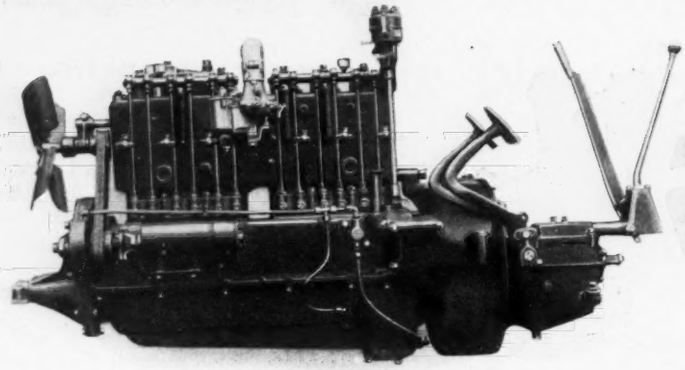
Interesting Features of the New King



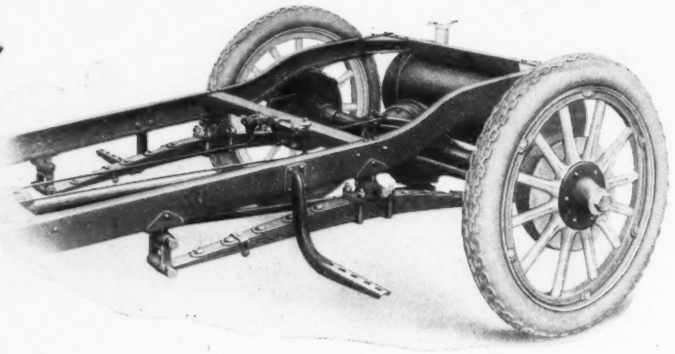
A combination light illuminates the rear seats and may also be used as a trouble lamp. Under the light plug is a compartment suitable for carrying small articles. The cowl boards are Circassian walnut finish



Showing the individual front seats with auxiliary seats in the rear compartment. The upholstery is worsted cloth with color to match the paint scheme in this sedan. The windows are carried in a compartment in the rear of the tonneau seat



Push-rod side of the overland-valve Falls motor used in the Elgin 1917 six



Full cantilever springs hung beneath the heavier frame. The extra cross member is shown

Elgin Offers Longer, Lower Model for 1917

Wheelbase Increased 2 In., Frame Strengthened, Full Cantilevers Adopted

THE Elgin six for 1917 is in the matter of outward appearance and most evident characteristics an entirely new car. The wheelbase has been increased from 114 to 116 inches and the body is hung low and rakishly as in the last year's model, but carries out these characteristics even more apparently because of the addition in wheelbase length and the adoption of the center cowl.

One striking improvement in the 1917 car is the adoption of full-cantilever spring suspension in the rear. The springs are very long and are swung beneath the frame in an unusual manner. This permits the much-sought-for flat, horizontal spring with the cantilever construction. It is quite evident that the riding qualities with such a suspension are especially good.

The frame is much heavier than that on the previous model and an extra cross member has been added further to increase the rigidity. The frame tapers narrow to the front, giving a short turning radius and is as wide as will permit at the rear, giving stability and preventing frame stress.

The same make of motor is being used, it being a Falls overhead-valve six with 3-in. bore and 4¼-in. stroke. The change here is in the manifolding. The intake manifold has been eliminated and the carbureter now bolts directly to a flange cast on the cylinder. The intake manifold is integral with the cylinder head. This construction permits high mounting of the carbureter. The exhaust manifold is also cast with the cylinder head.

A special 1-in. Stromberg carbureter is used with hot air connection to an exhaust-pipe stove. The previous make of ignition will be surplanted with Remy and the electrical system will be Wagner two-unit, with the starting motor operating through the Bendix principle. A Gardner battery completes the new electrical equipment.

Again reverting to the motor, the overhead valves are located in a removable head. Timing gears are spiral cut insuring quiet operation. Cast iron is adhered to in the pistons which are 3¼ in. long and fitted with $\frac{3}{16}$-in. rings.

The clutch is a Borg & Beck dry disk and drive from that to the rear axle is through a shaft and two universals with 1½-in. seamless-steel tubing instead of a solid shaft. This is used to eliminate drive-shaft whipping at high speeds.

The rear axle is floating with a pressed-steel housing to which a large cover plate is bolted in the rear. The differential gears are Brown-Lipe-Chapin spiral-cut and the differential is the four-pinion type running on annular ball bearings.

The body of the touring car is finished in a deep royal blue with black hood, fenders and running gear. The center cowl and long-lined body is in keeping with the most up-to-date practice. The windshield is tilted at an angle which is moderate, performing the function of reducing reflection and giving the car a racy appearance without being set on an extreme rake. The upholstery is of black, long-grained leather inlaid with French plaits. The top is one-man with jiffy curtains.

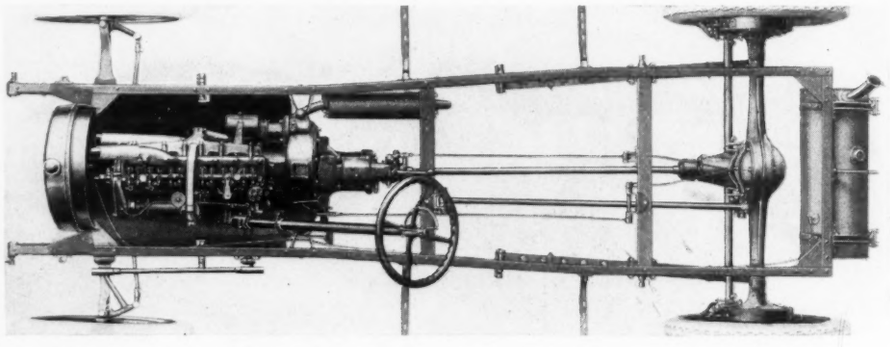
In the four-passenger roadster the back of the rear seats rises over the deck in a continuous unbroken line. The front seat is divided to permit entrance to the rear, there being but one door on a side. The color is Elgin gray with black radiator, fenders and running gear, and the wheels are light cream with black striping.

Equipment for both models includes Stewart speedometer, charging indicator, dash lamp, ventilating windshield, motor-driven horn, extra tire rim, coat and foot rails, etc. The price for touring car and roadster is $985 f.o.b. Chicago.

BETHLEHEM TRUCK SOON

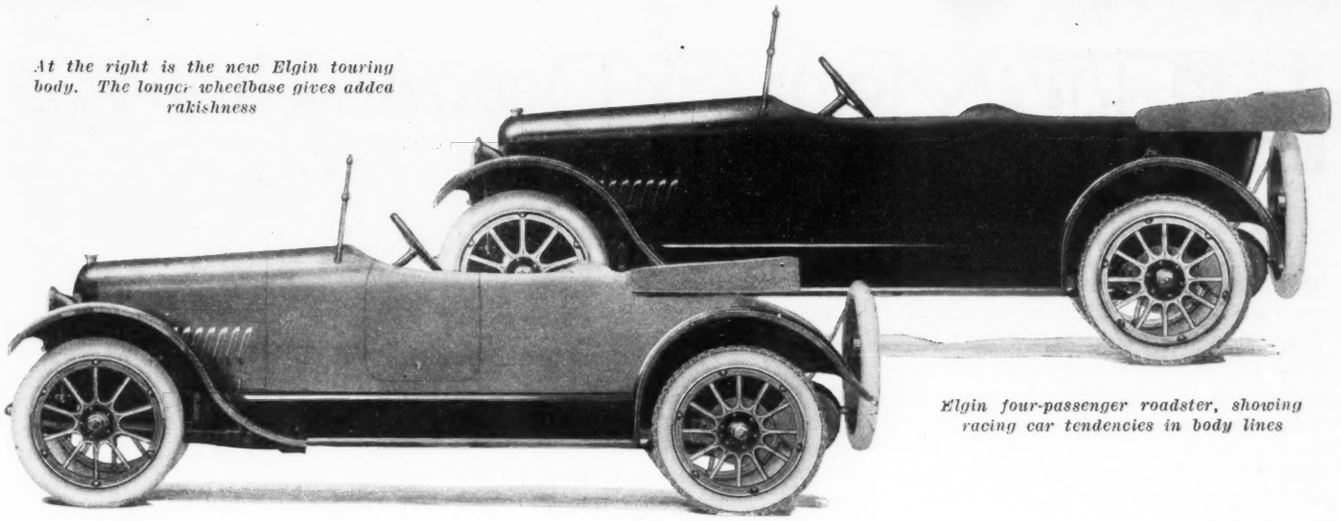
New York, Dec. 18—Two models of trucks, of 1¼ and 2 tons capacity, will be marketed about next February by the Bethlehem Motors Corp., Allentown, Pa. A new plant, which, when completed, will have a floor space of approximately 199,000 sq. ft., is being built. The concern has a capital of $6,000,000, made up of $1,000,000 preferred, paid in, and $5,000,000 common. The preferred is all held by the four men who head the concern.

Arthur T. Murray, formerly of the Brady-Murray Motors Corp., heads the concern as president. Associated, besides



The new Elgin frame has been made especially rigid by the addition of another cross member

At the right is the new Elgin touring body. The longer wheelbase gives added rakishness



Elgin four-passenger roadster, showing racing car tendencies in body lines

Allentown and Bethlehem capitalists, with Mr. Murray is W. S. Stevenson, formerly sales manager of the old Mack Bros. Motor Truck Co., who will be sales manager of the Bethlehem company. D. G. Dery, a silk manufacturer, is vice-president of the company. A large production is planned for the first year and the vehicle will have nothing radical in its design.

COMET BUYING FACTORY SITE

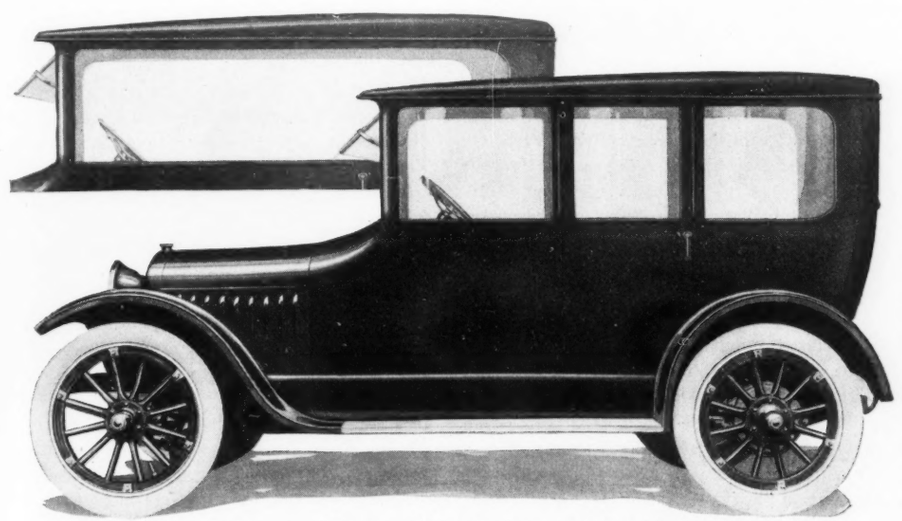
Decatur, Ill., Dec. 18—The Comet Automobile Co. has purchased 20 acres of land here, upon which a modern plant will be at once erected for the construction of motor cars. The main building will be 900 by 100 ft. The Comet will be a six-cylinder car, to sell around $1,000. A model will be on exhibition at the show to be held in Chicago in January.

WINTHER PERFECTS ORGANIZATION

Kenosha, Wis., Dec. 18—The Winther Motor Truck Co., organized recently with $300,000 capital to manufacture motor trucks, has perfected its organization with the election of these officers: President and general manager, Martin P. Winther; vice-president and factory manager, William Martinson, secretary, treasurer and sales manager, Walter D. Rightmire; directors, M. P. Winther, William Martinson, W. D. Rightmire, Jerry W. DeCou and Walter M. Burke. The truck will be known as the Winther. A specialty will be made of fire-fighting apparatus, and the Winther company has effected an alliance with the Peter Pirsch Co., Kenosha, Wis., fire apparatus, for the joint production of such cars, to be trade-marked "Pirsch-Winther."

TRACTOR CO. FOR MILWAUKEE

Milwaukee, Wis., Dec. 18—The Line Drive Tractor Co., Pierre, S. D., organized recently with $1,000,000 capital and financed to a large extent by Milwaukee capital, is preparing to establish its permanent factory at South Milwaukee, Wis. Materials have been purchased for the initial issue of 1,200 machines, which are unique because steering and operation is manipulated by a pair of lines, the opertaor being seated on the wagon, implement or vehicle being drawn by the tractor. The organization includes the following well-known persons: David E. Ross, Ross Tool & Gear Co., Lafayette, Ind., chief consulting engineer; I. W. Davis, superintendent of the Stowell Co., South Milwaukee, superintendent of construction; R. S. Strader, manager of the service department. Mr. Strader for 8 years was associtaed with the M. Rumely Co., Hart-Parr Co. and Detroit Tractor Co.



The new Inter-State convertible car. The appearance when open is shown in the upper left corner

STUDEBAKER WHEELBASE 122 IN.

Through a typographical error, the wheelbase of the Studebaker was given in the December 7 issue of Motor Age as 102 in., whereas it should have been 122 in. In the caption on the second page of the description, reference was made to the interior of the Studebaker limousine and the statement made that the front seat of the limousine might be revolved. It is quite evident that the cut referred to is that of the sedan and we are informed by the Studebaker Corp. that the front passenger seat in either the limousine or sedan cannot be revolved, this feature being found only in the touring car.

STEGEMAN TO DOUBLE CAPACITY

Milwaukee, Wis., Dec. 18 — Additions and extensions now being made by the Stegeman Motor Car Co., manufacturing Stegeman worm-drive trucks in 1½ to 7-ton capacities, will increase the capacity more than two-fold before the middle of 1917. At this time the company is erecting a new assembling shop, 150 by 240 ft., one-story, with saw-tooth roof, and equipped with three traveling cranes. Fixtures will be set into the concrete floor. Another new building is that for administrative purposes, 65 by 100 ft., one-story and basement. The present assembly shop will be turned over to the manufacturing department and considerable new tool equipment will be added. This will include milling machines, boring mill, boring bar, radial drills, grinders, etc. The Stegeman company will build its own transmissions and rear axles. The output of trucks will be increased to nearly 1,000 a year.

The Motor Car Repair Shop

Motor Age Readers and the Rebuilt Ford

IN THE Readers' Clearing House department of Motor Age a plea has been given and already liberally answered for photographs and descriptions of Ford cars which have been rebuilt either for actual speed or for speedy lines in the body. The data asked for concerns the cost of each rebuilding operation such as the new body, cost of underslinging, cost of motor alterations, cost of added equipment, etc.

Although the number of answers so far received is still well under a dozen, it appears that the underslinging of the frame is almost universally favored. Motor alterations tend toward the use of a high-tension magneto in place of the regular Ford flywheel instrument and a larger carbureter of different make than is regularly furnished.

Although there have been a large number of inquiries forwarded to the Readers' Clearing house department concerning the advisability of planing down the cylinder head to afford higher compression, of the rebuilders who have sent in their specifications none of them make mention of the alteration. Motor Age has contended in the reply to each of these inquiries, that such an alteration would not pay for its cost, in fact would possibly create a slower instead of a faster motor.

Planing Head Increases Compression

When the head is planed down the compression on the cylinders is increased, that is very true. But it is also true that the volume of the explosion chamber is decreased and it is quite likely that the decrease in combustion space will as much as or more than compensate for the higher compression. This is considering that the cylinder is not rebored to a larger size. Of course the reboring would slightly increase the combustion space and thus slightly compensate the lower head, but when one stops to consider that reboring can not possibly increase the bore over a few thousandths of an inch it may be seen that this slight increase would permit the head to be lowered a very slight amount still to maintain the same combustion space —probably not enough materially to increase the compression.

Motor Age is particularly anxious to have details of underslinging the Ford car with the same springs used. There is surely some simple device which someone has devised which can be easily built and installed by an amateur repairman. After a creditable number of descriptions have been received we shall attempt to sum it all up into what one might term the ideal rebuilt Ford car.

We will endeavor to show why it is far preferable to increase the compression by installing non-leaking piston rings than by planing down the head. We want experiences from those who have done the work, on how a regular Ford camshaft may be machined for high-speed work, how much the timing may be set ahead; how much the cylinders may be bored out and how much the valves can be enlarged without undue weakening of the cylinder casting.

Pass Ideas Along

If you will give your idea to others then yet others are going to become interested and give their ideas to you. Some other man may have some little kink, easily built, on his Ford car that, if you put on yours, will increase the speed several miles an hour. You may have something that will benefit him as much. When a goodly number of these descriptions are boiled down the very nearly ideal reconstructed Ford car should result. If you are not a draughtsman send us a rough sketch of some device you have put on your Ford which you think would interest others. Describe it and tell us what it will do. In a month or two Motor Age will give a resume of the various jobs and give what appears to be the finest points of all summed up into one car.

If you have merely removed the Ford body and applied a pair of bucket seats, photographs and description would be of little interest. It is to point out the alterations which a man can do himself as much as possible, and cheaply if it must be done outside, that will interest the readers.

While still on the subject of Fords the writer has noticed to his surprise that what appears to be a majority of Ford owners do not know how to crank their cars. On a cold day you will see many a Ford driver set his spark up about a quarter of its travel, pull the chocker wire on the front of the radiator and then crank his motor with short pull-ups throwing the motor over one cylinder only. And he will crank and crank, evidently in perfect peace of mind until eventually his dogged persistence causes enough gas to be sucked into the motor to cause an explosion.

The chocker wire does not prime the carbureter. It merely serves to cut off the air supply which goes into the carbureter so that a heavy charge of gasoline is drawn into the cylinders.

Try starting your Ford like this: Set the throttle nearly half way up. Pull out the chocker wire and hold it out. Then, with the crank, rock the motor back and forth on the compression of one cylinder eight or ten times. While this is being done the intake valve of one cylinder is open and the rocking motion is sucking a quantity of gasoline into that cylinder with each movement of the crank.

Then, with the chocker wire still pulled out, throw the motor over, spinning it if possible. That one cylinder which has been drawing in gasoline will very probably fire vigorously, and once your motor is turning over it should continue running. If it stops repeat the rocking operation. The spark should be thrown ahead at the earliest possible moment after the motor first fires, because with a cold motor this will often cause what lean gasoline goes to the cylinders to turn the motor over until things are warmed up. At least, this method of starting will get you away much quicker than the process of mere cranking alone.

If your Ford motor has been overhauled, or if for any reason the gearset and drive shaft have been separated it is well to ascertain that the cotter pins have been replaced in the flange which surrounds the universal and in the upper supports of the radius rods. If these cotters are out the assembly is bound to loosen and cause a chucking back and forth which will not only make a disagreeable noise, but will very likely loosen the rivets which connect the differential and drive-shaft housings.

Installing Cut-Outs

For those who install cut-outs on Ford muffler pipes, it is not necessary to drill a hole into the muffler pipe to apply the cut-out. In most cut-outs directions are given for filing a hole, although many inquiries have been received asking how a man without a drill press is going to fit a cut-out. For those who have not received instructions with their instruments the following will help:

With a large three-cornered file start operations on the portion of the muffler pipe where you have decided to locate the cut-out and on the circumference of the pipe where the discharge gas opening in the cut-out should be, depending on the construction of the cut-out, of course. Cut this hole diamond-shaped with this file until its four corners are, when measured from opposite corners, about equal to the diameter of the cut-out outlet. Then attach the cut-out. A similar hole may be cut in with a hack saw, and possibly quicker.

Overland Contracts for 154,525 Cars

Dealers at Toledo Convention Sign Up for $131,346,250 Machines First 2 Weeks

TOLEDO, Ohio, Dec. 16—Contracts totaling 154,525 motor cars with a value of $131,346,250 have been signed during the first 2 weeks of the Willys-Overland Co.'s convention for dealers. More than 6,500 dealers and guests have been entertained during that time.

The business of the last week, amounting to 66,975 cars with a value of $56,928,750, was received from dealers from the zones of the Middle West, New England and the South. The first group ordered 29,200 cars, the second 24,025 and the third 13,700 motor cars. The convention will come to a close next week. The South Dakota, Minnesota, Wisconsin, and eastern Iowa dealers will visit the company on Monday and Tuesday, and the New York, Indianapolis, Cincinnati, Lexington, Louisville, Lima and Evansville dealers will bring the event to an end Wednesday and Thursday.

The most important feature of this week, aside from the industrial achievements was a parade held on Thursday when the various guests and many employes joined a march, with many novel floats, through the city. More than $150,000 worth of motor cars were used.

DICKSON NATIONAL HEAD

Indianapolis, Ind., Dec. 16—The National Motor Car and Vehicle Corp., today announced the resignation of Arthur C. Newby, founder and for 16 years president of the company, and the appointment of George M. Dickson, general manager, as his successor. Sixteen years ago Mr. Newby established the National factory which has grown to be one of the largest in Indiana. On account of his continued ill health, he realized the necessity several years ago for preparing a successor, and appointed Mr. Dickson general manager. Mr. Newby continues to be the largest individual stockholder.

Mr. Dickson is not a newcomer in the motor car field, as he has been associated with Newby for the last 15 years. With a change of titles the new officers of the company are the same individuals who have assisted in the management of the factory for the last 10 years. They are George M. Dickson, president and general manager; William Guy Wall, vice-president and chief engineer, and M. E. Elstum, secretary-treasurer.

EXPOSITION OF AERONAUTICS

New York, Dec. 16—An exposition for the advancement of aeronautics is scheduled to be held in the Grand Central Palace February 8 to 15. This was decided upon by the executive committee of Motor and Accessory Manufacturers last week. The committee has been formed to confer with similar committees of the National Automobile Chamber of Commerce, the Aero Club of America, the Pan-American Aeronautic Federation and the American Society of Aeronautic engineers. Members of these committees will pass upon the character of the show and those who represent the M. & A. M. inclue C. W. Stiger, C. E. Thompson and William M. Sweet.

SPACE SCARCE AT MILWAUKEE

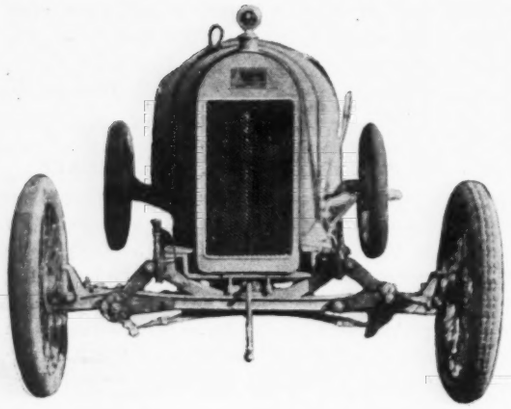
Milwaukee, Wis., Dec. 18—Fifty dealers have taken space for the ninth annual show to be held here January 5-11. The passenger car exhibits overflow into the basement, heretofore used only for motor truck displays. Spaces also have been arranged in the corridors and entrance of the Auditorium, in which the show is to be held, for accessory exhibits.

OVERLAND ET AL. INCREASE WAGES

Toledo, Ohio, Dec. 16—Wages of employes of the Willys-Overland Co. will be increased to total $1,250,000 per year. The wages of companies allied with the Overland company have been increased $225,000 per year at the Electric Auto-Lite Co., $350,000 per year at the Morrow Mfg. Co., of Elmira and $100,000 per year at the Morrow Mfg. Co., at Elyria, Ohio. The rates of increase are: All rates up to and including 30 cents per hr. will be increased 10 per cent; all rates over 30 cents and including 40 cents per hr. will be increased ½ per cent; all rates over 40 cents per hr. will be increased 5 per cent; all piece work rates will be increased 5 per cent.

This shows the irresistible British "tank" on the brow of the incline making its way over the rough ground. In the foreground are shown German prisoners being escorted to the rear lines by British soldiers

The Readers' Clearing House



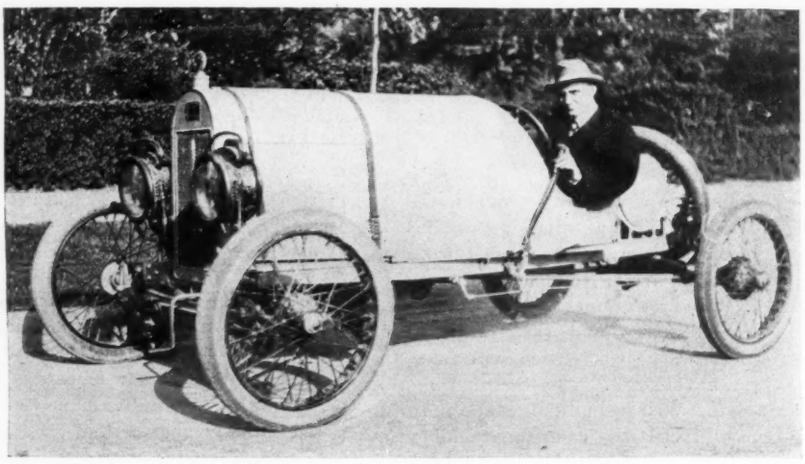


Fig. 1—Rebuilt Ford with overhead-valve motor block which, it is claimed, may be duplicated for $1,000. The car has attained a speed of 72 m.p.h.

Rebuilt Fords Described and Pictured

REBUILDS FORD AT SMALL COST

Builds Body for $20; Frame Lowering Done For $8

WOODBURN, Ind.—Editor Motor Age—In reply to your request in page 46 in the December 7 issue of Motor Age, I hand you two views of my Ford speedster. Fig. 3.

The body was built by myself and S. Roberts, a local carpenter, in about 4 days, at a cost of $20 for material exclusive of seats.

The frame was underslung or dropped by myself, and by my own idea at a cost of about $8. The motor is equipped with a Bosch magneto and a Master carbureter. It was rebored and aluminum pistons fitted by the Butler Mfg. Co., Indianapolis, Ind.

After trying out two different ratios of differential gears I am at present using the regular Ford gear ratio and find that I get practically the same speed that I did with the higher ratios. Of course, this is for half-mile tracks and good country roads. On a speedway no doubt a slightly higher ratio would be best. On a good country road my car will travel 60 m. p. h.

I find the car practical both for racing and pleasure driving. The weight is about 1,350 lbs. I would like to communicate with other owners of Ford speedsters. —Paul R. Augspurger.

Lengthens Ford Wheelbase

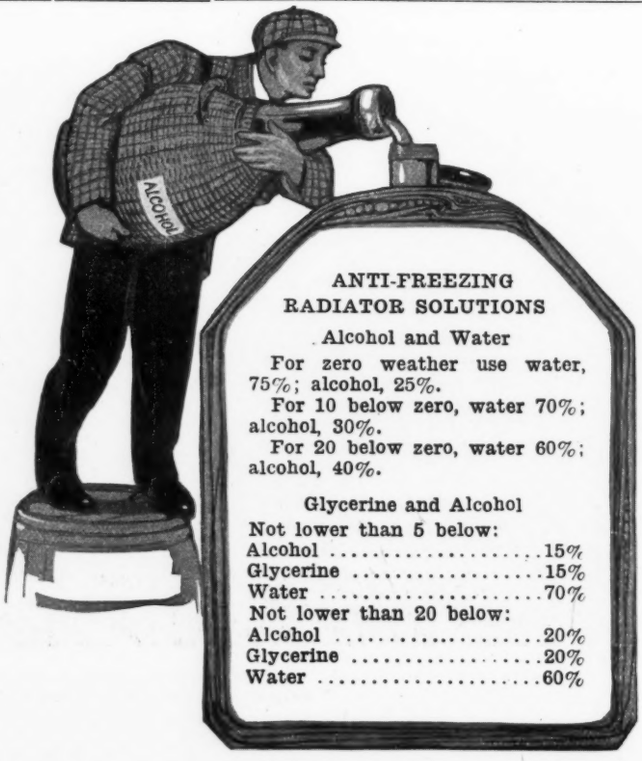
Elkhart, Ind.—Editor Motor Age—In your issue of December 7 you ask for pictures of rebuilt Ford speedsters. I am sending photographs—Fig. 2—of one I built and have driven all summer. I have lengthened the wheelbase to 116 in. and dropped the frame 5 in. It certainly holds the road fine, and with 3 to 1 gears will do 60 m. p. h. A friend of mine and myself drove the car to Mackinaw City and back last summer without any trouble.—C. S. Monteith, 903 McPherson street.

Two Batteries in Saxon

Lake Forest, Ill.—Editor Motor Age—I read the inquiry of J. T. Lowe, Mt. Vernon, S. D., as to combining two sets of batteries for ignition. In a 1914 Saxon runabout I attained that as follows:

In a convenient place on the dashboard I placed a double-contact, double-throw knife switch. To one end I connected wires of a storage battery and to the other end, wires of dry cells. To the two remaining terminals of the switch I connected the ignition wires of the Atwater Kent system, which before were connected to the dry cells, as originally this car was equipped with dry cells only. By throwing the switch either way I can use either storage battery or dry cells for ignition, one absolutely independent of the other and also

If the Weather in Your Locality Changes Over Night Use Too Much Anti-Freeze



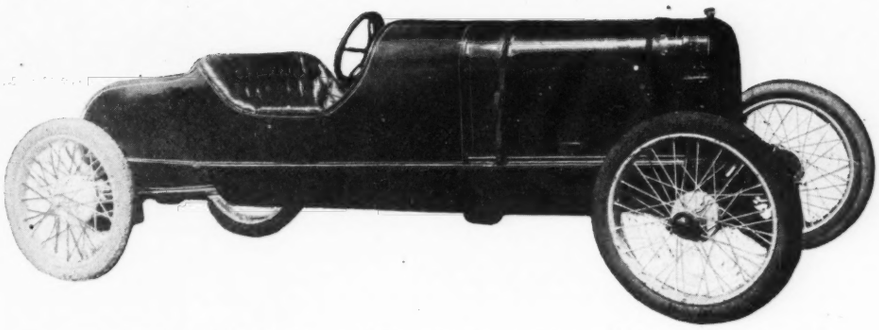


Fig. 2—This rebuilt Ford has a 116-in. wheelbase and is capable of attaining 60 m.p.h.

without the least disturbance of the regular ignition switch or wiring.—Gilbert B. Jansen.

PUT NO KEROSENE IN RADIATOR

Will Evaporate Quickly, Smell Bad and Deteriorate Rubber Hose

Harrisburg, Pa.—Editor Motor Age—It has been suggested that instead of using alcohol or other anti-freezing solutions in the radiator, that I drain the water entirely out and put in kerosene. Would this provide effective cooling on moderately warm winter days, and would any other harm be done than the action on the rubber hose?—J. N. Leids, Jr.

This is not advised. Of course it would not freeze and would cool the motor, although pure kerosene is much more volatile than water and it would evaporate rapidly with an accompanying evil smell. Furthermore, a leaky hose line is no place for such a readily ignited fluid as kerosene. At any event kerosene would soon set the rubber leaking because of its deleterious action.

REBUILT FORD DOES 72 M. P. H.

Has Sixteen-Valve Motor, Bosch Magneto, Rayfield Carbureter

Champaign, Ill.—Editor Motor Age—I have sent you photographs of my reconstructed Ford, Fig. 1. There are several very unique features about this car, all of which are of my own design, and were worked out in our shop in Cleveland, Ohio.

It is equipped with special fittings for underslinging. These, however, are adjustable for clearance, the limits being 3 to 7½ in. The motor used is Ford with the exception that it has a sixteen-valve block with the eight intake and eight exhaust valves of 1⅝ in. diameter. The valves are operated by special camshafts.

The car is fitted with Bosch magneto of the DU4 type, Rayfield carbureter, very light reciprocating parts, Houk wheels, Hartford shock absorbers, and Goodrich tires. The radiator, which is of special design, is so braced that we have had no trouble with leaking so far.

The car will run as slow as 18 m. p. h. with a 3 to 1 gear ratio and over a measured course of 5 miles maintained a speed of 72 m. p. h. This car was in several races in New York and Pennsylvania and has won every race it finished. We are very well pleased with its performance as a racer. It has a force-feed oiling system and gearless differential. This car can be duplicated for $1,000.—G. L. Dryer, Box 156.

REBUILDING FORD CARS

Already three Motor Age readers have answered the request made in the December 7 issue, page 46, for photographs and descriptions of Ford cars which have been rebuilt for racing, and the three jobs surely show originality and ingenuity.

There are a great many Motor Age readers living in rural districts or in small towns who are anxious to rebuild their Ford cars during the winter months, and it is these men to a great extent who are interested in what others have done.

Let them know how you rebuilt your Ford through the columns of Motor Age. The fast-growing sentiment towards reconstructed stock car racing and especially toward rebuilt Ford racing is going to interest a big number of amateur mechanics.

Help the sport along by sending pictures of your rebuilt Ford together with a complete description telling how much each alteration cost you, how much of it you did yourself, where you bought special parts from, how much reboring, new pistons, new radiator, new body, etc., cost. Your letter together with illustrations will be printed in these columns if the job is of real merit.

RACING BODY ON 1912 HUDSON 33

Lowering of Frame Would Involve Expensive Alterations to Chassis

Winnetka, Ill.—Editor Motor Age—I have a 1912, 33-horsepower Hudson touring car which I want to rebuild into a racer. Kindly publish a drawing showing how such a racer should look. I desire to lower the frame by putting on flat springs and using 32 by 3½ or 31 by 3½ tires instead of the 34 by 4 tires now in use.

2—What kind of a motor is used in this model?—James S. Scheimar.

1—A conception of a racing-car body applied to this chassis is shown in Fig. 4. It is not advised that an attempt be made to lower the frame. In fact, to do this, it would probably be necessary to install a new frame to give enough clearance over the axles. The reduction in tire size is possible of course.

2—The motor is a Continental.

HUDSON SUPER-SIX HORSEPOWER

Development at Various Engine Speeds Given—R. P. M.

Houston, Tex.—Editor Motor Age—Kindly give the following information relative to the Hudson Super-Six motor:

1—Bore and stroke of the motor.

2—Piston displacement of same.

3—Horsepower rating according to N. A. C. formula, at 600, 800, 1,000, 1,200, 1,400, 1,600, 1,800, 2,000, 2,200, 2,400 revolutions per minute.

4—What is the maximum number of revolutions per minute and horsepower for this motor?—W. E. Matthews.

1—The size of the Super-Six motor is 3½-in. bore by 5-in. stroke.

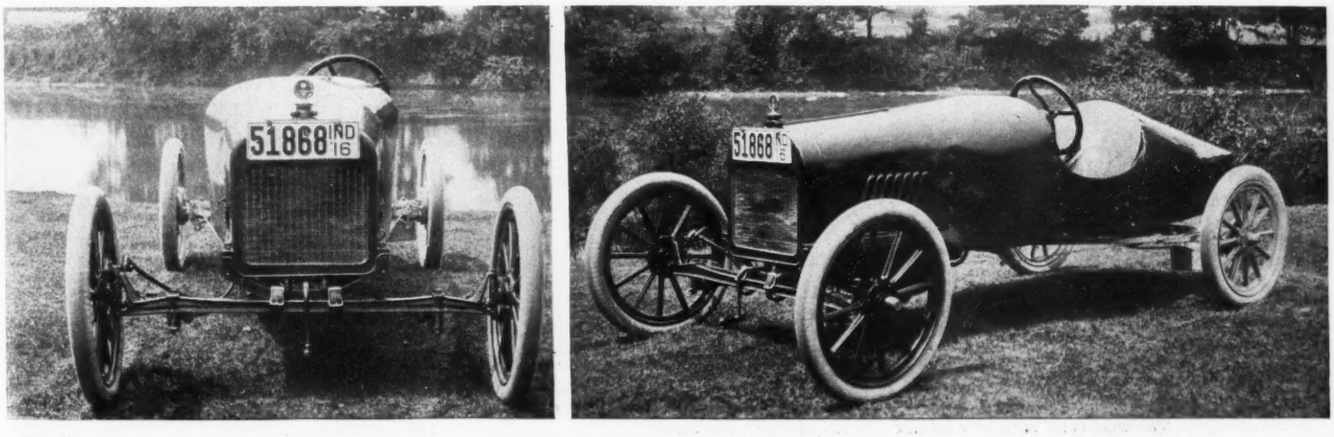


Fig. 3—The body for this reconstructed Ford was built for $20 and the work and material for lowering the frame cost $8. The car will travel 60 m.p.h., so it is claimed

2—The piston displacement is 288.6 cu. in.

3—The horsepower rating according to the N. A. C. C. formula is: at 600 r. p. m., 14.7 h. p.; at 800 r. p. m., 19.6 h. p.; at 1,000 r. p. m, 24.5 h. p.; at 1,200 r. p. m., 29.4 h. p.; at 1,400 r. p. m., 34.3 h. p.; at 1,600 r. p. m., 39.2 h. p.; at 1,800 r. p. m., 44.1 h. p.; at 2,000 r. p. m., 49 h. p.; at 2,200 r. p. m., 53.9 h. p.; at 2,400 r. p. m., 59.8 h. p.

4—According to the factory the maximum horsepower is 80, but that it has attained as high as 114 b. h. p. on the dynometer stand. The motor was designed for 2,600 r. p. m. but it has been successfully run at 3,000 continuously.

STREAMLINE BODY FOR HUPMOBILE

Cylinder Reboring Would Give More Power If Properly Handled

Ottawa, Can.—Editor Motor Age—I am rebuilding a Hupmobile 20 into a racer. The very best speed I could do this past summer was 38 or 40 m. p. h. Would it increase the speed perceptibly to have the cylinders bored larger and equipped with aluminum pistons and connecting rods?

2—How much more bore would these cylinder blocks stand?

3—In equipping the stripped car with Hartford shock absorbers, would Motor Age advise taking a leaf from each spring?

4—Kindly illustrate and describe a streamline body on a Hupmobile 20?

5—Would it be of advantage to have the bore increased the small amount I will be able to do it?—T. Roberts.

1—It seems that 40 m. p. h. is a very good speed to obtain for a car of such small size and old age. However the reboring of the cylinders and fitting of aluminum pistons, if properly done, would increase the speed, possibly 5 m. p. h.

2—The bore should not be increased over .025 in.

3—It should facilitate the riding qualities and still give sufficient strength.

4—A streamline design that might be applied to this roadster is shown in Fig. 6. To gain a really good-looking job a higher radiator should be installed. However, the same radiator may be used, the hood sloping as shown in the dotted line.

5—If you must have more speed, yes. It is not an inexpensive alteration and, in our opinion, would not pay.

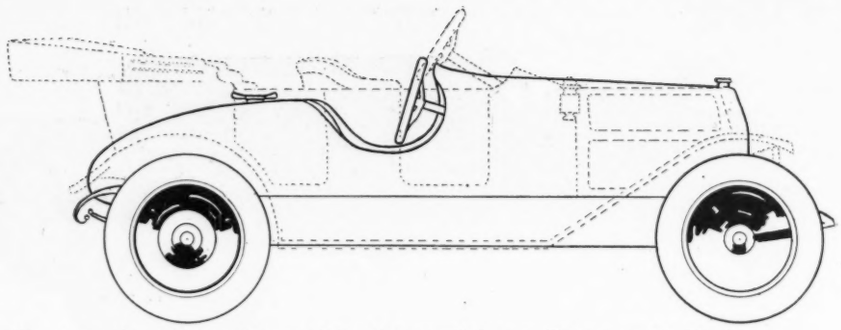


Fig. 4—A streamline racing speedster body applied to a Hudson model 33 chassis

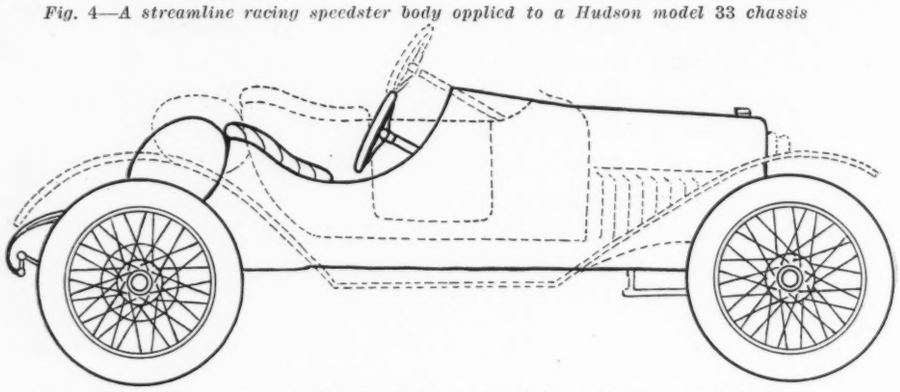


Fig. 5—Sketch showing how a model 30 Buick may be stripped down into a speedster

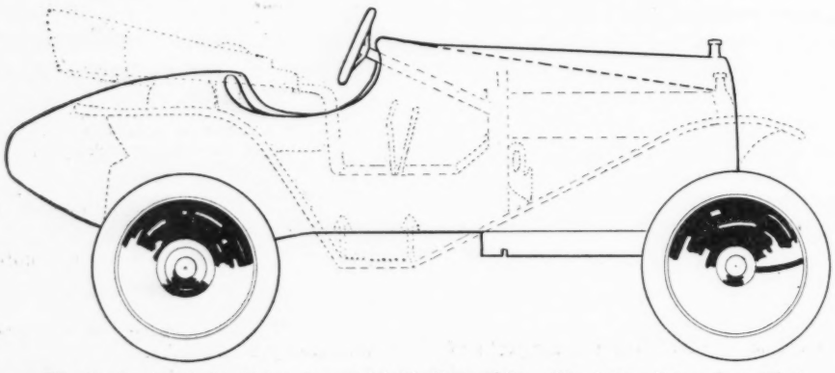


Fig. 6—Racing body design for model 20 Hupmobile. The heavy lines show what may be done with a high, narrow radiator. Using the regular radiator the hood would appear as shown by the heavy dotted lines

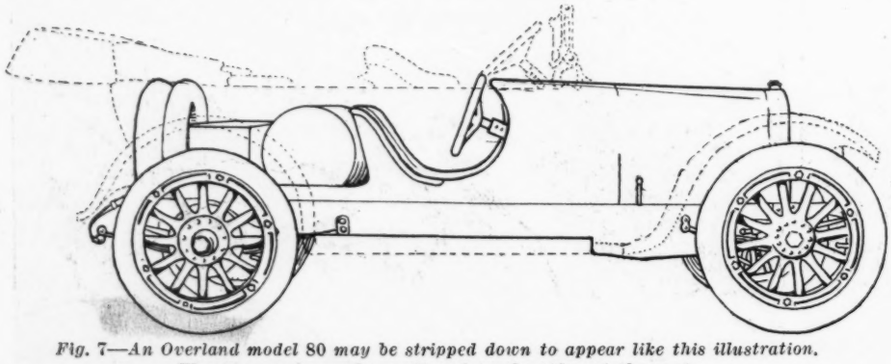


Fig. 7—An Overland model 80 may be stripped down to appear like this illustration. The new cowl may be continued to the sides of the seats

SKETCH OF STRIPPED BUICK M. 30

Installation of Bucket Seats and the Building of a New Cowl

Connellsvlle, Pa.—Editor Motor Age—Publish a sketch showing a Buick 1913 roadster model 30 cut down.

2—What gear ratio would be advisable to use for high speed work, and what speed should it make?

3—What is the speed of this car when in good condition?—Joseph Soisson.

1—An idea of how this model may be cut down is shown in Fig. 5. It would be a matter of installing a pair of bucket seats and possibly building the cowl around these seats as shown in the sketch. The seats should be so placed as to give the correct driving distance for the operator when the wheel is lowered.

2—Possibly this more or less slow speed motor would stand a gear ratio of 2¾ to 1. We would advise nothing lower than this.

3—There is no available record of the speed of this car.

REBUILDING OVERLAND MODEL 80

Sketch Shows Body Design Possible at Small Alteration Cost

Baton Rouge, La.—Editor Motor Age—I am rebuilding an Overland 80 touring car into a speedster, and would appreciate a sketch of a body for same. I want to have everything as low as possible. I would like to have everything on a level with the top of the hood, the seats to lay flat on the floor with the front of the seats tilted back 1 in. This car is being built for a man 6 feet tall.

2—Advise if cantilever springs could be put on this car.

3—Give an idea of what changes have to be made to the levers and pedals.—A Reader.

1—A speedster body design for use on this model is shown in Fig. 7. As you will

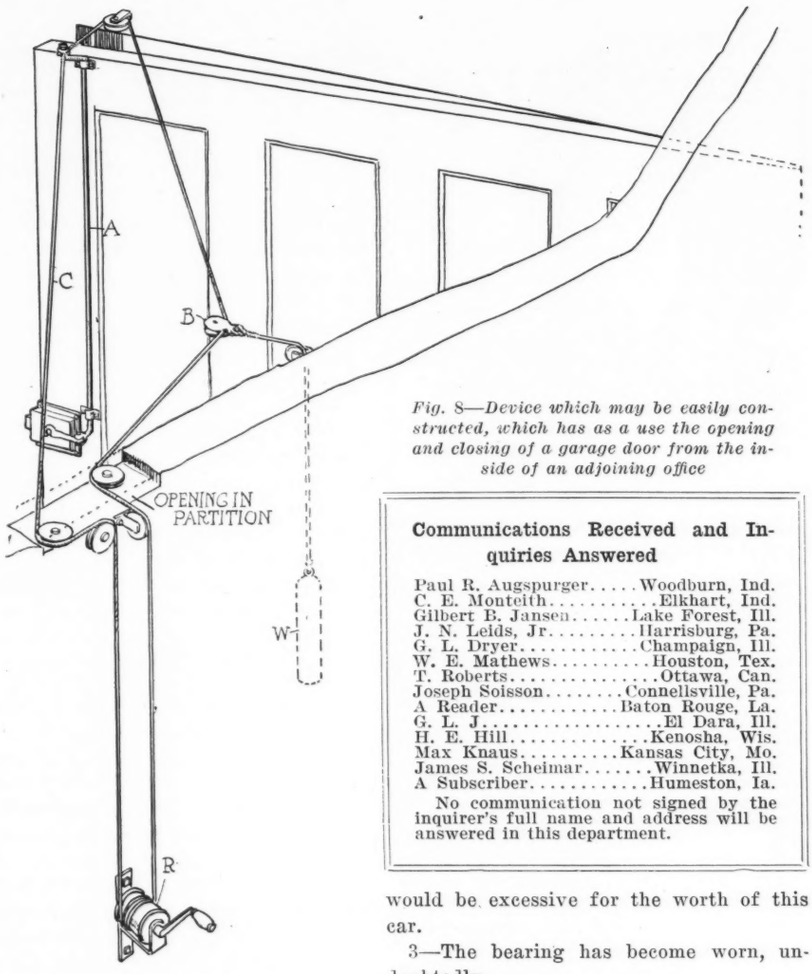


Fig. 8—Device which may be easily constructed, which has as a use the opening and closing of a garage door from the inside of an adjoining office

see there is nothing which projects to any appreciable degree above the top of the hood. Any capable body-builder or sheet-metal worker could build up a body for you with your car and this sketch to go by. The building of an extra cowl and the insertion of bucket seats would not be difficult to proportion.

2—The car is not designed for cantilever suspension and the alteration would be an expensive one.

3—There would be no need of changing the pedals and levers. Lowering of the steering wheel to correspond with the new driving position would be enough.

DESIGN FOR RAMBLER SPEEDSTER

Necessary to Install Bucket Seats and Lower Steering Wheel

El Dara, Ill.—Editor Motor Age—Kindly give a diagram for converting a five-passenger Rambler model 63 into a two-passenger speedster.

2—Is there any way of changing the expanding cone clutch on this car into a plain cone? If so, how?

3—What is the cause for the gearbox on this car leaking grease at the front main bearing?

4—What is the r.p.m. of this motor?

5—What changes are necessary to lower the steering wheel more than its adjustment will permit?—G. L. J.

1—An idea of a speedster body that might be applied to a model 63 Rambler car is shown in Fig. 9. If you did not wish to go to the expense of having a body of this style built up you might leave off the oil tank deck and install bucket seats only.

2—Not without going to an expense that would be excessive for the worth of this car.

3—The bearing has become worn, undoubtedly.

4—There is no record of this.

5—Bending of the steering arm up to take up the difference.

Communications Received and Inquiries Answered

Paul R. Augspurger	Woodburn, Ind.
C. E. Monteith	Elkhart, Ind.
Gilbert B. Jansen	Lake Forest, Ill.
J. N. Leids, Jr.	Harrisburg, Pa.
G. L. Dryer	Champaign, Ill.
W. E. Mathews	Houston, Tex.
T. Roberts	Ottawa, Can.
Joseph Soisson	Connellsville, Pa.
A Reader	Baton Rouge, La.
G. L. J.	El Dara, Ill.
H. E. Hill	Kenosha, Wis.
Max Knaus	Kansas City, Mo.
James S. Scheimar	Winnetka, Ill.
A Subscriber	Humeston, Ia.

No communication not signed by the inquirer's full name and address will be answered in this department.

SALT AS A REMOVER OF CARBON

It Is Harmful to Anything Containing Iron and Average Owner Should Avoid

Kansas City, Mo.—Editor Motor Age—In reading the August 3 issue of Motor Age, I noticed in the Reader's Clearing House department an article by H. W. Jordan regarding salt as a carbon remover. You state that it may remove some carbon, but that it will do more harm than good. Please give reasons.

The salt under actual tests does remove carbon and does not either injure the valve seats or the walls of the cylinders. I have used salt for some time on various motors, among them the Chandler Six, that he mentioned, and find it works very satisfactorily. With the use of salt as a carbon remover as well as any other substance, one must have experience in such matters.—Max Knaus.

Salt is injurious to any alloy containing iron. The fittings of ocean steamships are brass, propellers on small salt-water plying craft are brass. If a driver pours salt into his motor without exerting extreme care it is going to get through into the crankcase and adhere to other metal parts. The use of salt by the average owner is not advisable. If you thoroughly understand its shortcomings and take care of them accordingly, your results may be satisfactory.

Door Opener for Garage

Kenosha, Wis.—Editor Motor Age—We are building a garage with two 6-ft. swinging doors and the office between them. Can Motor Age suggest suitable means for controlling the opening and shutting of the garage doors from the office, either by motor or hand power?—H. E. Hill.

A home-made door-operating mechanism which could be built at small cost is shown in Fig. 8. As may be seen it consists of a cable operating on a drum and through a series of pulleys. You will note that the ends of the cable are attached to a lever, which when the drum is first turned opens the lock of the door. As the door is closed it may be seen that the cable will loosen from the drum R and this is compensated by the weight W which is secured to the pulley B. When the door is open this weight will be well up out of the way. By turning the crank on the drum to the right, or clockwise, the door will open and by turning it counter-clockwise the door will close.

Wants Job in Car Factory

Humeston, Ia.—Editor Motor Age—What is the quickest and best method of obtaining employment in some reliable motor car factory? I have had some experience with various makes of cars, but have never done garage work or anything of the sort. However, I am young and willing to start at the bottom to learn.

Are inexperienced men employed, or is it necessary to have taken a course at a school?—A Subscriber.

If it is your serious intention to start in the motor car business and you are willing to risk a few dollars in getting started it is suggested that you go directly to Detroit and apply at the factories or through an employment agency for a position. There is a great cry for men in the Detroit factories, but the big demand is for skilled labor. The best way is to present yourself in person. The factories want men on the spot that they can look at and size up for their capabilities.

Practical experience is the big thing, and if you cannot afford to travel at this time, it is suggested that you secure a position in a garage and familiarize yourself with motor car repair work.

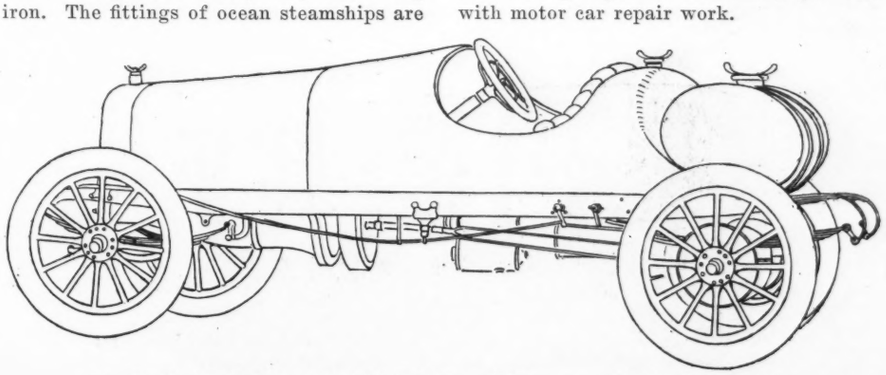
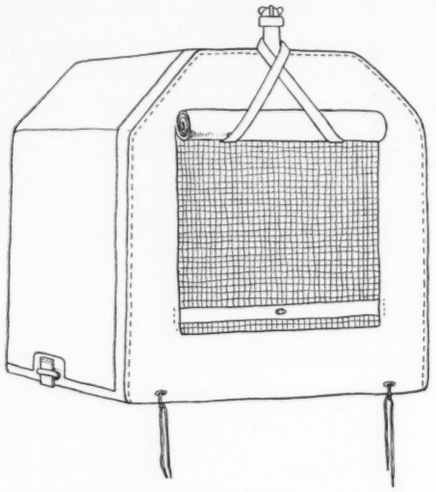


Fig. 9—Racing body on model 63 Rambler with large gasoline tank in the rear

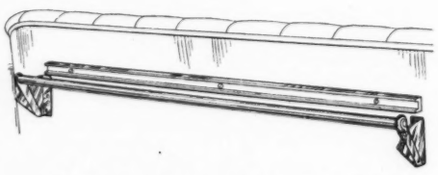
The Accessory Corner

Slip-Over Cover for Fords

A COMBINATION radiator and hood cover which closes together into a tight-fitting unit may be had for old model Ford cars for $1.60 and for the 1917 models for $1.90. The covers are made of heavy material, thoroughly padded. In applying, the hood cover is slipped on first and locked in front by a hole which fits over the radiator cap and on the sides by leather tongues which slip through the hood-lifting handles. The radiator cover slips over this, having a top fastening in a hole which slips over the radiator cap and a bottom fastening by strings which are tied to the springs, or some part of the radiator or frame. A cloth gauze covers the front of the radiator and a flap may be closed over this or rolled up out of the way. When down, the flap is held in place by a button which fits into an eyelet in a leather strip which crosses the gauze near its lower portion. When the flap is folded up a suspender is revealed from under the flap which is looped over the radiator cap to hold the flap in place. Wisconsin Auto Radiator and Hood Cover Co., 612 Wells street, Milwaukee, Wis.



Combination hood and radiator cover for use on Fords, which retails for $1.60



Robe rail which embodies combination lock to insure against theft of robes

Inclosed Tops for Buicks

The Anchor Buggy Co., Cincinnati, O., introduces demountable tops which are now being produced for models D-44 and D-45 Buick cars. The side panels of the Anchor top are so constructed that the windows may be easily detached in a few minutes, making an open car for warm weather. The tops are constructed of pressed steel and wood and fit firmly around the body and windshield. There are drop ventilating windows, dome lights and the doors in the top and body open as one. The interior is lined with light whip cord cloth.

Security Motor Car Robe Rail

The security robe rail locks the robes carried in the car into the rail in one operation. The rail is made of steel throughout and is fitted with a combination lock which can be operated in the dark by one who knows the combination, so it is claimed. The rail is fastened to the back of the front seat and requires no more room than the ordinary rail. It can be nickel plated or enameled in any color desired. It is manufactured by the Security Auto Robe Rail Co., 433 South Flower street, Los Angeles, Cal.

Racing Car Super Carbureter

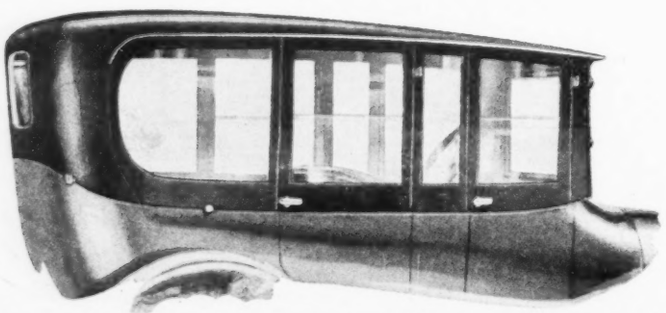
A feature of the Binks carbureter is that the area past the jet may be varied, at the same time keeping the jet in the most constricted area with a wide open throttle and combining a true venturi action. The instrument is said to give strong acceleration, rendering gear shifting much less frequent in hill work and providing maximum speed for straightaway travel. There is a pilot jet for very slow running, and starting the engine when cold is made easy, no flooding being necessary, as with the flap drawn up tight fuel will spray out of the main jet due to the high velocity past it. Under ordinary conditions starting is accomplished on the pilot jet. Charles Binks, the inventor, is prepared to sell patents and rights of his carbureters for the United States. Binks carbureters are now manufactured in England in various styles for gasoline, kerosene and heavy fuels for both cars and trucks, prices of the instruments varying with their type and size. H. C. Binks, Ltd., Eccles, England.

Kickless Krank for Fords

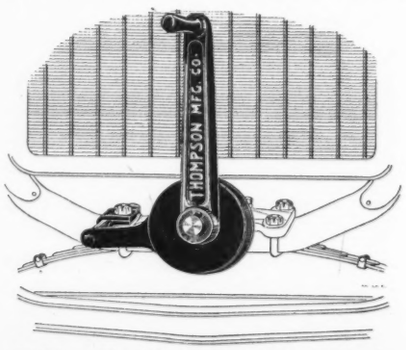
A crank may be fitted to the same mechanism which holds the stock crank of the Ford car, and insure the operator against injury from back kick. Should the engine kick when one is cranking with this device a patented release allows the motor to turn backward without turning the crank. When not in use the crank is held up out of the way. The claim is that it can be installed in 15 min. with the use of a wrench only. This product of the Thompson Mfg. Co., Des Moines, Iowa, sells for $4.50. The same company makes an electric gasoline heater, which is merely an electrical element in the carbureter float chamber which is operated through a switch on the instrument board. Of course, its function is to facilitate starting when the motor is cold. The price is $4.50.

Scored Cylinders Alloy Treated

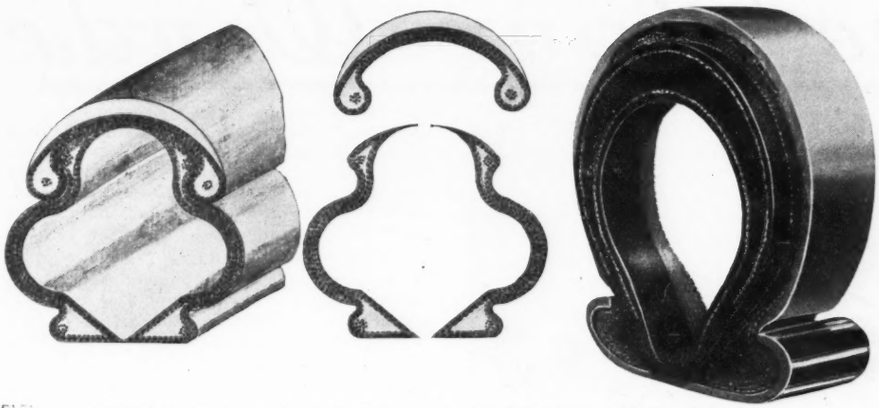
By a patented method, shallow or deep scores in cylinders are filled with silver and nickel alloy applied electrically and smoothed down to the face of the cylinder wall. The alloy that is used has sufficient heat-resisting qualities and is very hard. When applied it forces its way into the pores of the iron amalgamating with it and becomes a part of the cylinder. The expansion and contraction is in very close ratio with that of the cast iron. During



Demountable top for application to Buick D-45. The windows are removable for warm-weather driving



Kickless Krank for application to Ford cars



The three views on the left show a tire made in three sections composed of two side walls and tread all interlocked. At the right is the unusually thick Sternwear inner tube

the operation of repairing the scores, there is not enough heat to warp the cylinders, thereby eliminating need of regrinding or reboring the cylinders and fitting of new pistons and rings. This work is done by L. Lawrence & Co., 1522 Michigan Ave., Chicago, 1246 E. Jefferson, Detroit and 292 Halsey St., Newark, N. J. The company offers service of 24 hours after the cylinder is received.

Foot Tire Pump

The construction of the Peteler foot tire pump is compact. The highest quality plungers and cup washers are used in order to insure pump efficiency. This pump is unique in action as compared with other foot tire pumps in that when the foot pushes the lever down, the barrel of the pump is brought forward at the same time that the piston is pushed into the pump. This sort of double action gives the desired stroke with a very compact mechanism. The list price is $5 and it is marketed by Moreau & Pratt, 1834 Broadway, New York.

Lynite Piston Construction

Over fifteen motor car manufacturers will use Lynite pistons as a part of their regular production in 1917. This piston is made by a unique method. The permanent mold process turns out a piston very different in all important properties and characteristics than the sand-cast article. The metal is more dense and is said to have a hardness practically equal to that of cast iron. The construction permits of walls of uniform thickness and strength and can be designed with a much smaller cross-section. In the Lynite process piston, it is claimed that machining cost is cut to the minimum, outside finishing only being necessary. The Aluminum Casting Co., Cleveland, Ohio.

Tire Made in Three Sections

B. C. Roberts, 218 Euclid Ave., Trenton, N. J., has designed a tire made in three sections composed of two side walls and the tread all interlocked so that when applied to an ordinary rim and inflated to a few pounds pressure, the tube is yet strongly protected by a very flexible tire. The two pieces composing the side walls are identical and hence interchangeable and the tread for a tire of given size will fit any pair of side walls or in fact any standard tire of the same size. In repairing the tire any one of the three parts can be replaced.

Sternwear Inner Tube

Sternwear pneumatic tubes are designed to give upwards of 20,000 miles service and not puncture or blow out. They are the product of the Sterns Tire & Tube Co., St. Louis, Mo., and are the invention of Edward O. Sterns, president of the concern.

Shine-Brite Body Polish

The Shine-Brite Products Co., Indianapolis, Ind., has developed a liquid wax polish which is just being placed on the market. It is manufactured from pure wax oils and other ingredients combined and emulsified by a process whereby the wax is held in solution. When applied, it gives the car a thorough cleaning and imparts to it a lasting shine, so it is claimed. The polish is free from all acids, alkali or turpentine or any other ingredients which are harmful to enamel surfaces.

Improved Easyon Tire Chains

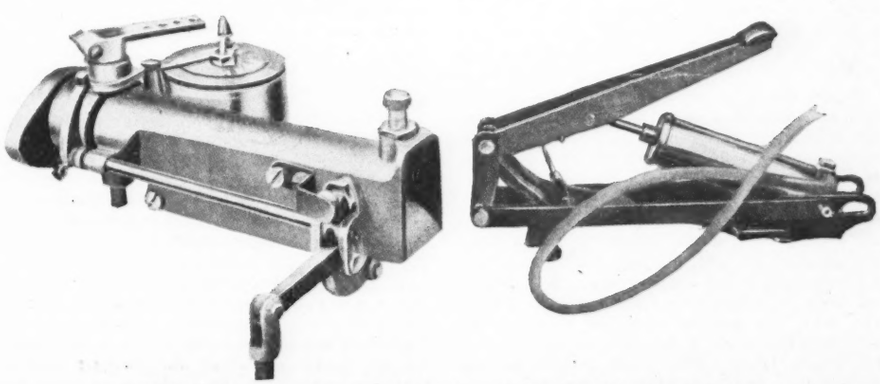
The 1917 Easyon tire chains, manufactured by the Leather Tire Goods Co., Niagara Falls, N. Y., show some important improvements over the old style. These are single chains fastened to the spokes with leather-covered fasteners. The new chains, instead of being made of welded links, are made of steel more than ⅛-in. thick, rounded and perfectly smooth where they come against the tire, but having the thin edges projecting away from the tire, so that they give a powerful grip to the road. On the middle of the tire the gripping member is comparatively small and narrow so that it causes no bumping on pavements, but being long and straight the ends stick out, taking a deep hold in mud or snow. The chains are packed in a set of eight in a bag, four for each rear wheel. They are made in three sizes; small size which fits 3 or 3½-in. tires and sells for $3 per set, medium size which fits 4 or 4½-in. tires and sells for $4 per set, and the large size for 5 and 5½-in. tires selling for $5 per set.

Cement for Curtain Windows

With no-stick cement, lights can be replaced in side curtains without removing the curtain from the top. A strong union is made which is claimed to be water-tight and impervious to heat or cold. It is being put up in ounce cans which contain sufficient cement to repair a number of lights, retailing at 25 cents, and in pint cans for large consumers at $2. It is marketed by the Auto Products Mfg. Co., 40 Elm street, Buffalo, N. Y.

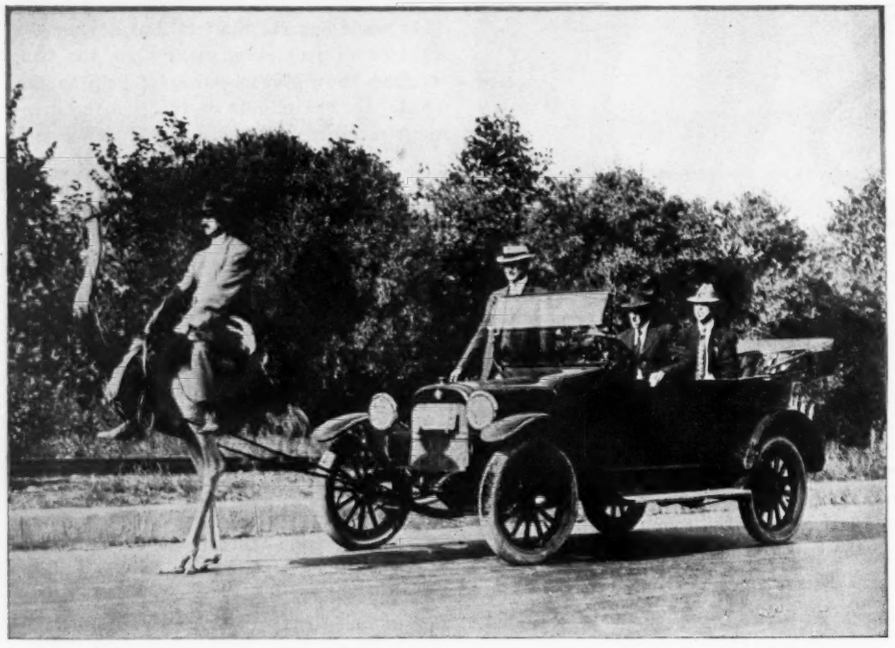
To Save Fire Insurance

It is claimed that Fyr-Fyter extinguishers carry the indorsement of the Underwriters' laboratories and save motorists 15 per cent on motor car insurance. The 1-quart extinguisher consists of a strongly-built brass reservoir, a manually operated pump and a sensitized gravity valve and pick-up mechanism that insures the discharge of the liquid contents in a solid stream. The pump capacity is so much greater than the liquid discharge that a powerful stream is quickly brought into action and continuous pumping is made unnecessary. The pump handle turns either way, causing no delay in moments of excitement, and a blaze 30-ft. away may be effectively played on. Fyr-Fyter Co., Dayton, Ohio.



The Binks carbureter, shown at the left, permits variable area past the jet, at the same time keeping the jet in the most constricted area with a wide-open throttle. At the right is the compact Peteler foot tire pump

From the Four Winds



OSTRICH PULLS MOTOR CAR—A trained Nubian ostrich here demonstrates its pulling power and the light running qualities of a modern motor car by pulling an Inter-State car with three passengers aboard.

PAST Century Mark But Motors—Mrs. Ruth L. Sharpless, Whittier, Cal., who is 106 years old, drives a Studebaker, the levers having been lengthened for her aid.

Java Has 759 Cars—Of the 759 automobiles imported into Java for the first 6 months of this year, 668 cars came from the United States, fifty-three from Italy and thirty-two from the Netherlands.

Former Racer to Sell Cars—Johnny Jenkins, former racing driver of Cole and White cars, is to be general manager of the newly organized Jonesboro Motor Car Co., Jonesboro, Ark., which will consist of garage and agency for cars and accessories.

She Is 83 But Motors—It takes the old citizen to appreciate the change brought by the motor car. Aunt Sarah Hewitt, Danville, Ill., 83 years old, has owned a car for 2 years. "I cover in 22 minutes the distance that required 3 or 4 hours half a century ago," she says.

To Tend Cars at Home—The Nelson Motor Car Maintenance Co., St. Louis, has opened a service station which offers to supply experts to visit cars in the home garage twice a week and make all repairs. A stipulated price, fixed after an inspection of the car, will cover all repairs up to 2 hours a week.

Grade Crossing Abolition Sought—Legislative appropriation to give the state of Pennsylvania start toward the abolition of grade crossings is to be brought to the attention of the general assembly. The report submitted to the state public service commission by Investigator John P. Dohoney shows 403 accidents at grade crossings in the year ending June 30, last, 161 persons being killed. As there are 11,776 grade crossings in Pennsylvania, of which only 1,794 are protected in any way, the general abolition of crossings will call for a large amount of money and for much time. The state public service commission has been seeking gradual abolition of crossings by dividing the costs with the railroads, the counties and the towns. An appropriation of a quarter of a million dollars may be asked to take care of the state's end of such matters.

Goats Fight Their Reflections—Two goats owned by Tony LaMantia, an Italian fruit dealer of Homer City, Pa., tried to wreck a new motor car the other day when they saw themselves reflected in the glistening surface of the machines. The owner had washed and polished the car until it shone like a mirror and left it in an alley near the La Mantia store while he went on a short errand. Returning he was attracted by a crashing noise in the alley. He found a goat on each side of the car, making running leaps and delivering smashing jolts to imaginary opponents reflected in the machine. Several parts of the machine were damaged.

Pennsylvania Uses Farm Tractor — The growing use of the tractor on Pennsylvania farms is shown in reports of the state department of agriculture, which give the number as 540. There are more than 200,000 farms in the state.

No Repairs; Gasoline Perhaps—On order of the police commissioners, Macon, Ga., garages must close their repair departments on Sundays. Only drugs and necessities can be sold under the new rules. The exact status of gasoline is undetermined so far.

Taxes Amount to $1,750,000—The license tax during the first year of operation under a horsepower and weight scale will net Michigan $1,750,000, according to present indications. At the close of business Nov. 1, the secretary of state had received $1,726,222.30.

A Motor Horn to Read—One of Singapore's peculiarities is a motor publication called the Motor Horn. It is a weekly, printed in English and distributed to dealers in the Far East, most of whom are Mongolian. Various makes are considered, and the paper deals editorially with matters of general motor interest.

May Have Elevated Parking Place—If the plans of Toledo, Ohio, motorists do not gang agley an elevated way for the parking of motor cars will be provided for them. The plans have been offered to the commerce club. A small fee would repay the city for building. Driveways would be available under the "L."

Where Molasses Yields Fuel—A company has been formed in Natal, South Africa, to manufacture a distillate from molasses, which is for use as a substitute for gasoline. The plant will have a capacity of 2,000,000 gallons of natalite annually. The distillate has been tested, giving an average of 16.4 miles a gallon for a 22-horsepower car on a 500-mile drive.

Bad Weather Ends Road Marking—Bad weather was all that stopped the Lincoln highway crew of sign painters, who have spent the entire season in remarking and standardizing the road signs along the route of the transcontinental highway. Six states were crossed, and the marking ended in the seventh, Nebraska, after a total distance of 1,750 miles. About 8,000 markers were placed.

Denver Urges Winter Motoring—To arouse greater interest in winter motoring, the Automobile Trade Association of Colorado and the Denver Motor Club gave a dinner and dance at the Mount Morrison hotel, 17 miles southwest of Denver. Nearly 200 attended, making the trip in forty cars. Sales increase ranging from 50 to 300 per cent already are reported by distributors for Colorado and adjacent territory, who predict that the winter-driving enthusiasm they expect to see develop will produce fully as big gains for this winter over last. The dealers invited their customers and friends, while the motor club aids by inviting all members interested in such events. The motor car and accessory concerns were well represented at the Mount Morrison gathering, one supply house alone sending ten employes. A better acquaintance among the tradesmen themselves, more business for all branches of the trade, more enthusiasm and determined ac-

Good Roads Activities

$750,000 for County Roads—McKean county, Pa., has voted a bond issue of $750,000 for highways. This is the first time a bond issue has ever been submitted to the citizens of a county in this state. The vote stood three to one in favor of the bond.

Builds 610 Miles of Roads—The Ohio state highway commision had awarded contracts for 610 miles of road at an estimated cost of $8,000,000 during the year of 1916, when tracts for 38 miles of improvement were let Dec. 1. The awards of Dec. 1 are the last for the year and include roads in Brown, Butler, Clinton, Fayette, Hamilton, Harrison, Jefferson and Noble counties.

State Highway Commission proposed—A bill providing for the creation of a Texas state highway commission will be introduced in the legislature Jan. 8. The sentiment in favor of the proposed highway commission is so strong throughout that state that the enactment of the measure is believed probable early in the session. The bill would tax motor cars to meet the expenses of the highway department and to construct trunk highways through the state. Texas has $4,515,750 to its credit in the United States treasury, which will be available as soon as a state highway commission is created.

tivity for good roads work and a greater appreciation of Colorado's exceptional attractions for winter motoring are among the benefits expected to come from these fetes for winter motorists.

Washington Tags To Be Black—For the year 1917 Washington automobile license tags will be black with white numerals, instead of the lavender tags used this year with white numerals.

Museum for Motor Industry—A motor car museum has been established in London, where, among other models, gasoline cars of the year 1895, a steam tricycle of 1891 and a steam car of 1860 are shown.

Are Your Cushions of Shark?—The Bureau of Fisheries wants to exploit shark skins, heretofore considered waste material in the United States. Therefore, if when you prospect for the next model an enterprising salesman assures you that it is all shark, a yard wide and so on, you can know you have the latest in leather.

California Registration Reports—The receipts of the motor vehicle department of the state of California to Nov. 17, when the last report was prepared, showed 222,890 motor cars, 29,984 motorcycles, 13,951 chauffeurs, 1,505 car dealers and 199 motorcycle dealers. The total receipts from fees for these registrations was $2,166,429.38.

Motor Talks for Convicts—A Willys-Overland representative and Warden Talcott of the state penitentiary at Bismarck, N. D., agreed that the convicts might like a mechanical treat. So, when the representative was scheduled to address Bismarck dealers and prospects on the Knight motor, he extended his program to speak in the state institution. Permission was obtained from Governor Hanna.

Early Registry in Ohio—Applications for 1917 registration are coming in rapidly to the Ohio department. About 10,000 have been filed. For the coming year the branches in Akron, Cleveland, Cincinnati, Toledo and Youngstown will be maintained by the department. So far the department has issued 254,000 1916 registrations. That includes gasoline and electric car owners as well as dealers and manufacturers.

New Freight Rates for Cars—New through rates, somewhat lower, for the shipment of motor cars and parts have been authorized by the Interstate Commerce Commission from Springfield, Ill., to the middle west. The order was entered on the basis of the lowest combination of interstate rates to and from the Ohio river, affecting all points in Indiana, Illinois, Iowa, Wisconsin and all states south of the Ohio river.

All About Motors There—A complete course in the care, repair and general maintenance of motor cars, tractors, trucks, etc., has been instituted by the Y. M. C. A. of Racine, Wis., and nearly 100 young men are attending classes four and five evenings a week. The course is under Horace Eddy, a graduate of the University of Minnesota, who has been a member of the experimental division of the Nash Motors Co., Kenosha, Wis., until now.

New Lock for Motor Cars—Louis Pitti, St. Louis, has solved the problem of protecting his motor car from thieves. Mrs. Pitti went to a Turner hall entertainment, and Pitti went after her. He took 4-year-old Rose Pitti along, and she became sleepy; so Pitti wrapped her in blankets and left her on the rear seat while he went into the hall to find Mrs. Pitti. When they returned after 10 minutes the car was gone. Two hours later a policeman reported the car and Rose. He found her twenty blocks from the Turner hall. She said she woke up and called "Papa." Instantly the car stopped, and she saw a negro turning to look at the back seat. The negro ran and she screamed and a policeman heard her.

Railway Circularizes Motorists—The Columbus Railway, Power & Light Co. has issued a circular letter to motor car owners and drivers, advising them always to fear being hit, as a safe means of escaping such a catastrophe. The circular, which is part of a campaign to decrease the number of accidents in which street cars are involved, is approved by President Charles C. Janes of the Columbus Automobile Club and M. J. Caples, president of the Chamber of Commerce. Motorists are warned against the practice of turning in on the car tracks to avoid a more slowly moving machine ahead when a car is approaching from the rear of the machine.

Clubs and Associations

Seattle Club Elects—The Seattle Automobile Club has elected the following officers: President, R. M. Dyer; vice-president, John W. Roberts; secretary, Frank M. Fretwell, and treasurer, C. L. Morse.

Club Theft Conviction Plan—The Detroit Automobile Club has a plan to promote the prosecution of motor car thieves. Members are requested to sign a pledge card, promising to prosecute thieves who steal motor cars or accessories and to aid the club and its attorneys in obtaining a conviction.

Club Helps Get Bonds—For more than 3 years the Cleveland Automobile Club, backed by other civic organizations, has been fighting for better streets. The movement became so general that a $3,000,000 bond issue was ratified at the recent election. This means more than $6,000,000 will be available for the streets next year.

Denver Club to Build—A 65-acre foothill tract in Bear Creek canyon has been bought by the Denver Motor Club for a country home site. The property, known as Idledale, is about 20 miles from Denver along the granite boulevard through the city's municipal mountain park system. There is a large house and a few cottages, and it will be improved by a clubhouse and several cottages for use of members.

Canadians Organize Club—At a largely attended meeting of motor car owners of Cornwall, Ont., and the counties of Stormont, Dundas and Glengarry, held recently, the Cornwall Automobile Club was organized. More than 100 were present. They will try to obtain entry into the United States over the Ottawa & New York railway bridge just above the town. If this is done it will do away with the present scow ferry and bring tourists through Cornwall from all parts of Canada.

New Members for Missouri Association—Saline and Grundy counties have formed auxiliaries to the Missouri State Motor Association, which was organized Sept. 30 this year and which is composed of affiliated city, town and county motor car clubs. Other auxiliaries formed since Sept. 30 are those at Bethany, Albany, Cameron, Chillicothe, Brookfield, Butler, Nevada, Lamar, Carthage, Joplin, Neosho, Bolivar, Humansville, Osceola, Lowry City, Appleton City, Clinton, Smithville, Lexington, Marshall and Jefferson City.

To Aid in Detecting Thefts—The Omaha club has devised a system whereby every car dealer and garage owner in Nebraska will constitute himself a special investigator and assistant to the police in uncovering car thefts. If a garage man doubts the ownership of a car stopping at his place he will take the engine number when he fills the tank or makes repairs. He will have a list of stolen cars and by comparison of the car and list can determine whether the one he notes is stolen. The result will be reported to the police. The renting of isolated buildings by strangers also will be reported, especially if cars travel to and from the places.

Year's Registration in Pennsylvania—As 1916 receipts grow smaller each day 1917 receipts grow. Already the state treasury has $113,587 for 1917 Pennsylvania licenses, compared with $85,000 at the same time in 1915 for 1916 licenses. Receipts for 1916 are $2,320,256, an increase from $1,662,955 last year. High license is 231,232.

New Jersey Car Statistics—It is estimated that 300,000 motor car licenses will be issued in New Jersey during 1917. The new license tags will have a blue background and white letters. Beginning Jan. 1, uniform drivers' licenses, costing $3, will be issued, and 3-week permits for learners, heretofore free, will cost 50 cents.

Uses Motor Car Coaches—The Pennsylvania & New Jersey Railroad will use motor cars with special bodies and flanged wheels as coaches on a short line between Whitehouse and Gladstone, N. J. It is believed that in this way faster and more frequent service will be possible for the small communities thus served.

Does Your Car Mix With Eggs?—Here is a test for the easy-riding points of your car. An Oakland dealer wished to show the good qualities of his make, so he put a dozen eggs in the tonneau and took a 5-mile cross-country drive. One egg broke, but he declared an alibi in a loose wrench in the tonneau, and still stands by his car.

Chains for Dobbin—The adaptation of a motor car idea for the benefit of the horse has been tried successfully at Des Moines, Ia., by a teamster. A recent period of icy pavements was the mother of his invention. Using a small strap, he fastened chains under each foot of his horses and thus provided them with anti-skid casings. The horses worked through the icy weather without a single skid and in no way appeared to resent the innovation of chains on their feet.

Surveyors Want Motor Cars—A recent decision of the Ohio supreme court, that counties cannot purchase motor cars for surveyors as road-building machinery, will not have any effect on the use of cars by a majority of the county surveyors of the state. In most counties cars have been rented, and the net result is a financial loss to the county. An effort will be made to have the law amended at the coming session of the Ohio general assembly.

Teaches Motor Car Operation—The Dunwoody Institute, Minneapolis, is organizing unit night classes to study phases of motor car construction and operation. The first unit has three classes studying fundamental mechanical and electrical laws in twenty lessons. Another class will have ten lectures in construction, testing and repair of instruments and motors. Another unit will cover transmissions, clutches and steering gears. Other units are to be formed.

Green Replaces Wisconsin Red—Wisconsin motor car license tags for 1917 will have a white background, and the figures and letters will be done in green enamel, the plate of 1916 being duplicated, except that this year's tags are in red with a white background. The number will be preceded by the letter W and followed by the figures 1917. The secretary of state has closed a contract with a Green Bay, Wis., concern for 120,000 sets of plates. A year ago the secretary of state estimated that the 1916 registration would reach 110,000, but already more than 115,800 licenses have been issued. The estimate of 120,000 for 1917, therefore, is believed to be under actual requirements.

Among the Makers and Dealers

MUIR Is Advertising Manager—Gordon Muir has been appointed advertising manager of the Maxwell Motor Co., Inc.

Tire Company Increases Capital—The Punctureless Auto Tire Co., Akron, Ohio, has increased its capital from $100,000 to $1,000,000.

Denning to Auto Parts Co.—W. J. Denning has been appointed manager of the cataloging and advertising departments of the Auto Parts Co., Chicago.

Capital Increase Planned—The Phelps Mfg. Co., Columbus, Ohio, proposes to increase its stock from $100,000 to $400,000 soon. The company makes wire wheels for motor cars.

E. & J. Pay Third Dividend—The Edmunds & Jones Corp. paid its third dividend Dec. 20, amounting to 1¾ per cent on the preferred stock and $1 a share on the common stock.

To Represent Nash in Chicago—The Carl M. Green advertising agency has opened an office in Chicago, from which it will handle the advertising account of the Nash Motors Corp., Detroit.

Gardham with Chalmers—Joe Gardham, the racer, has joined the Chalmers Motor Corp. sales and export department force. Mr. Gardham was with the Chalmers company several years ago.

Branch for Factory Seconds—The Independent Tire Co. of Columbus, Ohio, has opened a branch in Memphis, Tenn., for the sale of factory seconds. J. M. Leacy, southern manager, is in charge and will make the branch his headquarters.

Pfeffer and Brinegar to Cuba—C. A. Pfeffer, who recently resigned as vice-president and assistant general manager of the Chalmers Motor Corp., and E. P. Brinegar, the man credited largely with the organization of the old E. R. Thomas-Detroit Co., have sailed on a pleasure trip to Cuba.

Trailer Company Changes Name—The Troy Wagon Works Co., Troy, Ohio, has changed its name to the Troy Trailer Sales Co. Arrangements have just been made for the sale of the trailers in Texas by the Barden Electric & Machinery Co., whose headquarters are at Houston, Texas, with branches at Beaumont, Galveston and San Antonio.

Used Cars for Malay—The Weber Implement & Automobile Co., St. Louis, has filled a repeat order for used Hupmobiles for the Malay Peninsula. The first was for twelve cars; the second, for three. The cars are put in good order in the company's shops and then packed in waterproof cases for ocean shipment, via San Francisco. The freight about equals the value of the cars.

New Tire Announced—The Pierce-Arrow Tire & Rubber Co., Germantown, Pa., is introducing a new patented puncture-proof pneumatic tire with a guarantee of 5,000 miles. Another feature claimed for the tire is that it does not heat up to anything like the degree noted in other tires when in use on the road. This is accomplished by a process and treatment which eliminates friction.

Receiver for Durable Truck—Upon the application of Robert T. Johnson, the common pleas court, Dayton, Ohio, has named Harry C. Harmon receiver for the Durable Dayton Truck Co., maker of motor trucks. In his petition the complainant claims that he became surety in the sum of $5,000 and has no security for the amount; that considerable machinery was purchased and the company is heavily indebted to others. The plant will be operated pending the litigation.

Heads Delion Tire Company—H. H. Coleman, for several years general agent of the Northwestern Mutual Life Insurance Co. of Milwaukee at Newark, N. J., has resigned to become president and manager of the Delion Tire & Rubber Co., Trenton, N. J.

Firestone Branch Managers Meet—The branch managers of the Firestone Tire & Rubber Co. are meeting at the home office, Akron, Ohio, this week. This is the first conference of its kind for the company, and forty-six branches are represented. The company already has had its annual sales convention, and this conference will be followed by a meeting of service men in the spring.

Coming Motor Events

RACES

—1916—

*December 25—Speedway, Los Angeles, Cal.

—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway.
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

*Sanctioned by A. A. A.
†A. A. A. championship events for 1917.

MEETINGS

January 9-11—Midwinter meeting, Society of Automobile Engineers.

SHOWS

December 26-30—Olean, N. Y., show.
December 30-January 6—Cleveland, Ohio, show.
January 2-10—Salon, Hotel Astor, New York.
January 5-11—Milwaukee, Wis., show.
January 6-13—New York show.
January 12-20—Philadelphia show.
January 13-20—Montreal show.
January 14-16—Rockford, Ill., show.
January 19-24—Manchester, N. H., show.
January 20-27—Detroit show.
January 22-27—Oklahoma City show.
January 22-27—Rochester, N. Y., show.
January 25-27—Asheville, N. C., show.
January 23-27—Allentown, Pa., show.
January 23-27—Baltimore show.
January 27-February 3—Chicago show.
January 27-February 3—Columbus, Ohio, show.
January 29-February 3—Buffalo show.
February 3-10—Minneapolis show.
February 10-17—San Francisco show.
February 12-17—Kansas City show.
February 12-17—Louisville, Ky., show.
February 12-17—Louisville, Ky., show
February 13-17—Sioux City, Ia., show.
February 14-17—Peoria, Ill., show.
February 14-24—Des Moines, Ia., show.
February 18-25—St. Louis, Mo., show.
February 19—Pittsfield, Mass., show.
February 19-24—Bridgeport, Conn., show.
February 19-24—Des Moines, Ia., show.
February 19-24—Duluth, Minn., show.
February 26-March 3—Omaha, Neb., show.
March 1-3—Urbana, Mich., show.
March 3-10—Boston show.
March 5-10—Bangor, Me., show.
March 6-10—Fort Dodge, Ia., show.
March 14-17—Davenport, Ia., show.
March 14-17—Mason City, Ia., show.
March 18-23—Cedar Rapids, Ia., show.
March 19-24—Syracuse show.

Chandler Declares Dividends—The Chandler Motor Car Co., Detroit, has declared a dividend of 1 per cent in addition to the regular quarterly 2 per cent disbursement.

Collins with Chevrolet—J. S. Collins, formerly zone manager for Dodge Bros., has been appointed sales manager for the Chevrolet Motor Co. to succeed F. K. Lane, who has resigned.

Porter Co. May Increase Capital — The Porter Rubber Co., Salem, Ohio, will hold a stockholders' meeting Dec. 27 to consider increasing the capitalization from $125,000 to $250,000.

Tire Company Buys Plant—The Post Tire & Rubber Corp. has bought the St. Louis plant of the Union Tire & Rubber Co. and will enlarge it to double the capacity. Three shifts are being used daily.

Eastern Motors Selects Home—The Eastern Motors, Inc., Hartford, Conn., has selected temporary quarters at New Britain, 10 miles from Hartford, but announces that Hartford is to be the final location.

Jackson Joins Briscoe Corp.—W. V. C. Jackson has been appointed comptroller for the Briscoe Motor Corp., Jackson, Mich. Mr. Jackson has been with the A. O. Smith Co., Milwaukee, Wis., for the last 5 years.

Lindeman Gets Promotion—C. B. Lindeman has been appointed head of the division of the Firestone Tire & Rubber Co. with offices in Akron, Ohio. Mr. Lindeman was formerly western advertising representative.

Duersten to Macon Motor Co. — W. E. Duersten, formerly production and efficiency expert of the Western Electric Co. and later connected with the Hudson factory, has been made factory superintendent for the Macon Motor Co. at Macon, Mo.

Kellum with Columbia Motors—E. F. Kellum has been appointed purchasing agent for the Columbia Motors Co., Detroit. Mr. Kellum was formerly with the Western-Mott Co., Flint, Mich. C. J. Martin, formerly deputy city comptroller of South Bend, Ind., becomes auditor of the company.

New Tool Company to Build—The Electric Tool & Appliance Co., organized recently at Milwaukee, Wis., will build a plant for the manufacture of patent box cutters and scientific laboratory apparatus. The capital stock is $20,000, and Oscar Werwath, president of the Milwaukee School of Engineering, is president.

National Supply Sells Out—The National Motor Supply Co., which has been manufacturing a line of motor car accessories in Cleveland, Ohio, for the last 8 years, has been taken over by a Painesville, Ohio, corporation. Contract for the erection of a large factory in Painesville has been let. It is understood that the stockholders received in the neighborhood of $200 per share, the par value being $100.

$10,000 for Bowser Salesmen—The S. F. Bowser Co., Fort Wayne, Ind., has a plan whereby it pays to be a pacemaker among salesmen. Eighteen of its salesmen have sold enough to belong to the pacemakers' club 5 years, and each salesman gets $50 for one year as a pacemaker with an increase of $50 for each consecutive year that he remains a pacemaker. Therefore, these eighteen men will get $250 each in January. Other prizes bring the total to about $10,000